SEPTEMBER 25, 1995 VOLUME 12, NUMBER 39

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Cabletron, Lotus, Sprint to launch products at NetWorld+Interop.

See pages 10 and 14.

New AT&T divestiture is a 'slam dunk'

By David Rohde and Joanie Wexler

New York

Users, analysts and even competitors last week practically gave AT&T a standing ovation for its plan to split into three publicly traded companies.

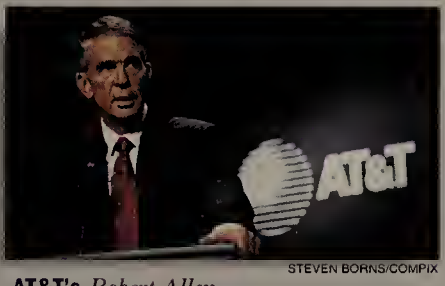
By separating its carrier services business from its computer and equipment divisions, AT&T hopes to eliminate conflicts of interest that have slowed the rollout of new services.

And by uniting its key equipment units — including the telephone company-oriented Network Systems and the user-oriented Global Business Communications Systems (GBCS) — AT&T will create a business that can compete more effectively against the industry's leading internetworking and telephone equipment vendors.

At least initially, little will change for AT&T service customers since all services — from plain long-distance to Asynchronous Transfer Mode offerings — will remain with the communications company. However, the breakup should enable AT&T to eventually ready new services faster than it has in the past because other divisions will no longer have a hand in the unit's

See **AT&T**, *page 135*

MOTIVES FOR THE MOVE



STEVEN BORNS/COMPIX

AT&T's *Robert Allen*

- Will make it easier for AT&T to sell gear to the carriers that it's battling in the courts and on Capitol Hill.
- It wants the stock market to value its equipment company like computer networking companies.
- It hopes to put more emphasis on its wireless services.
- It wants to unload AT&T GIS while leaving the computer company with a strong base of stockholders.

Bay: RMON'd and dangerous

By Jim Duffy

Atlanta

Bay Networks, Inc. this week will begin blanketing its product line with comprehensive network management capabilities by unveiling an array of offerings supporting RMON and RMON2-like capabilities.

The new products include a data collection module for low-end routers, packet capture and filtering software for higher end devices, RMON2-type enhancements for Bay Networks' agent software and a new version of its Optivity Design & Analysis application.

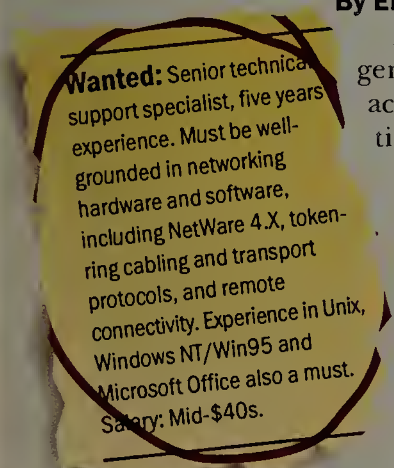
Remote Monitoring (RMON) is a standard for collecting data link layer statistics from LAN devices as part of an overall net management scheme. RMON2 is an emerging standard for collecting network and application layer data from network devices.

See **Bay Networks**, *page 135*

Power shift changes net salary picture

SALARY SURVEY 1995

By Elisabeth Horwitt



Wanted: Senior technical support specialist, five years experience. Must be well-grounded in networking hardware and software, including NetWare 4.X, token-ring cabling and transport protocols, and remote connectivity. Experience in Unix, Windows NT/Win95 and Microsoft Office also a must. Salary: Mid-$40s.

An ad similar to this one recently generated more than 100 applicants, according to the corporate information systems (IS) manager who placed it — this despite the fact that the salary figure had dipped by several thousand dollars compared to a year or two ago. "Network technicians are becoming commodities and are getting paid less," the manager explains.

Commodities? Experienced net-

Continued on page 75

NEWSPAPER $5.00

Novell refocuses but...

Will it work?

Novell bets its future on a strategic shift that analysts and customers say was overdue; off-loads UnixWare, SuperNOS.

By Kevin Fogarty

New York

No one knows for sure if Novell, Inc. can realize its new ambition — to provide the glue connecting devices from mainframes to toasters into a single coherent network. But one thing is clear: It has to try.

In a bold reshaping already covered extensively by *Network World,* the company announced last week that it will no longer pitch itself mainly as an operating system company. Integration is the new buzzword, and Novell now pledges to be the vendor that can blend NetWare, Windows NT, Unix boxes and more into a single client/server net that can be stretched across the Internet.

"This is a big deal," said Sheldon Laube, Novell's chief technology officer. "We're betting everything on this."

Network managers said Novell has a good shot at fulfilling its integration dreams. "They have a decent chance of pulling it off if they can stay away from distractions," said Gordon Divitt, president of FundSERV, Inc., a Toronto-based net services firm. But, he added, "the integration challenge is enormous."

Another user agreed. "Nobody else is in the position and has the resources that can chal-

See **Novell**, *page 134*

NEW NOVELL

The goal:
NetWare becomes the tie that binds heterogeneous networks.

How they'll do it:

- Letting NetWare be built into Unix flavors from HP, SCO and possibly others
- Build requestors on Windows NT and Unix, tying them to NetWare's directory and other services
- Adding SMP, clustering, memory protection to make NetWare a better applications server
- Unloading UnixWare

More on Novell

- UnixWare has a new home. **Page 134.**
- Novell's grand plan. **Page 134.**

Or check out our new Web site at http://www.nwfusion.com, and go to News+.

NetworkWorld Fusion

Automakers to build their own private Internet

By Ellen Messmer

Detroit

The Big Three automakers might not trust the Internet, but they all need it to reach trading partners.

The way out of this bind, it turns out, is pretty simple: Forget the public 'Net and build a virtual private Internet that blends the Internet's tradition of open access with robust security.

Chrysler Corp., Ford Motor Co. and General Motors Corp. last week pledged to do just that, jointly funding a project to build a TCP/IP network exchange point that links a select group of Internet service providers.

These providers will deliver fixed, secured links to the automakers' suppliers for the exchange of CAD/CAM designs, electronic data interchange documents, electronic mail and files.

The new net should help the automakers avoid an array of Internet growing pains, such as a recent brownout and problems discovered with Netscape's security technology last week (see story, page 136).

Dubbed the Automotive Network Exchange (ANX), this single virtual private Internet will

See **Automakers**, *page 136*

JOHN M. GALLOWAY

Chrysler's Fred Hakim, GM's Karl Schohl and Ford's Joe Boyd *said the three companies will team to create a virtual private Internet for sharing data with trading partners.*

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See us at NetWorld+Interop
Atlanta, September 27-29
Booth 2258

NetworkWorld
An IDG Publication

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BILL O'CONNELL

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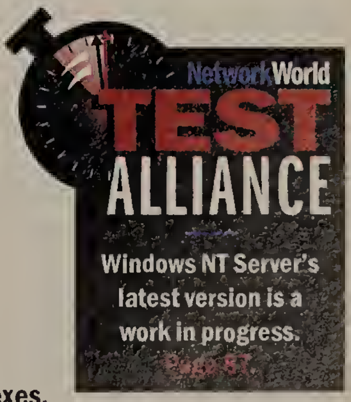

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NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

NetworkWorld Fusion

This Week

Go on-line to learn more about the top stories in this issue. Here are some of this week's highlights on Network World Fusion (http://www.nwfusion.com):

News+

The Front Page: Get detailed information on AT&T's split-up and automakers' Internet plans, along with more on our other top news stories.

The Technical Sections. Read about all the networking bugs in Win95; learn more about federal EDI efforts.

Industry Watch: On-line business columnist Todd Dagres looks at what it will take to settle the Wild West Internet frontier.

Forum

Your side: Voice your views on the AT&T breakup in our new forum.

NetRef

Buyer's Guides: Download product charts from recent guides.

Also on the Network World Fusion home page

- **Careers:** Executive summary of our annual networking salary survey.
- **Professional Development:** New seminars.
- **DirectConnect:** Download demo software.
- **Network World Central:** Get in touch with us.

this week's pick

Need help building your own Web site? Check out our links to Web resources. Go to NetRef, then select Technology Resources and Internet/Web.

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Briefs, September 25, 1995

Switch pitch I

■ IBM this week will fill out the low end of its campus switching family with new 16-port token-ring and Ethernet switches, as well as a variety of fast Ethernet and Asynchronous Transfer Mode adapters. The 8272 Token-Ring and 8271 Ethernet switches will boast a Universal Port feature to let users add another eight ports. Rounding out the product rollout will be Nways Campus Manager for AIX, an application for managing hubs and switches.

Switch pitch II

■ This week, Proteon, Inc. will introduce a trio of LAN switches scheduled to ship in November, according to industry sources. The CSX 900ER Switching Router features 24 10Base-T ports, two 100Base-T ports and three WAN links, and is priced at $6,295. The CSX 901T Token-Ring Switch sports 12 full-duplex ports and supports cut-through, store-and-forward and adaptive cut-through switching. It costs $10,495. The CSX 900E Switching Concentrator features 24 10Base-T and two 100Base-T ports, and costs $2,574. Proteon declined to comment.

Bad blood

■ The Internet Engineering Task Force (IETF) working group defining Version 2 of the Simple Network Management Protocol has disbanded — at least for a while — due to dissension among members over how to define the administrative and security components of the protocol. In an electronic message to the SNMP Version 2 working group last week, IETF network management area director Deirdre Kostick suggested a year-long cooling-off period before resuming work.

AT&T on-line

■ AT&T last week announced AT&T Business Network, a $39.95-per-month on-line service that offers a wide variety of news and business journals. The service includes 'Netaccess.

Channel surfing with Cisco

■ Cisco Systems, Inc. this week will unveil a new distribution channel strategy under which the company will bundle some of its low-end products under a single brand name. The CiscoPro product set will include the company's Kalpana switches as well as Combinet, Newport System Solutions and Cisco 1000 remote access devices, sources said. The products will be sold through distributors and resellers. Cisco declined to comment.

Ascend maxes out

■ This week, Ascend Communications, Inc. will introduce MAX 200, a PCMCIA-based remote LAN access server at NetWorld+Interop. With eight slots for PCMCIA modems and ISDN terminal adapters, the device provides dial-in and dial-out connectivity for corporate Ethernet LANs. Frame relay support will be added early next year, said Bernie Schneider, Ascend's vice president of marketing. The MAX 200 is priced at $2,400.

Microsoft 'Net news

■ Microsoft Corp. is expected to announce this week at NetWorld+Interop a stand-alone version of the Internet Explorer currently included in the Windows 95 Plus Pack. The browser uses licensed Mosaic technology from Spyglass, Inc. and provides FTP, gopher and other basic functions. Internet Explorer 2.0 is expected to provide browser and viewer functions. Microsoft will also highlight its Blackbird technology, used to prepare information content for use on The Microsoft Network.

You'll pay for this

■ NYNEX Corp. and The Chase Manhattan Corp. last week announced a prototype payment system for on-line products. The user sets up a personal vault and stocks it with credit, debit, automated teller machine or checking account numbers, or with prepaid tokens and coupons. Using a personal identification number, the user allows the vendor to withdraw payment from the vault. The system will be available starting next year.

Big Blue calls for backup

Company looks to Sync Research and Bay Networks to fill in its net product gaps.

By Michael Cooney

Raleigh, N.C.

In what has become a habit of late, IBM has called on some hired guns to help fight its network battles.

The mercenaries in this case are Sync Research and Bay Networks, Inc., whose frame relay access devices (FRAD) and token-ring switching products, respectively, IBM will resell as part of its own network line. IBM will remarket Sync's FrameNode and ConversionNode FRADs, as well as the Centillion 100 backbone token-ring switch from Bay Networks' recently acquired Centillion unit. As part of the deal, Bay Networks can resell IBM's 8272 Token-Ring switch.

IBM TECHNOLOGY AGREEMENTS

Partner	What IBM gets
Bay Networks	License to resell Centillion 100 token-ring switch
Sync Research	Remarketing agreement to sell Sync frame relay products
Cisco	Access to Kalpana technology for use in token-ring and Ethernet switches
Chipcom	Access to intelligent hub technology
Novell	Ability to market and develop NetWare for SAA gateway

The good and the bad

The products fill sizable gaps in Big Blue's communications family and offer IBM customers new tools to help them move legacy nets into the switched world.

But from a strategic perspective, the deals are a double-edged sword. On the one hand, IBM has freed itself from developing products in markets where other companies have already established themselves as leaders and can concentrate its resources on building products for Asynchronous Transfer Mode (ATM) nets — a key future growth area.

"We see these agreements as the best, most cost-effective way we can provide solutions for users. But in the long term, we see ATM as the backbone solution of choice," said Peter Chadwick, manager of network integration products for IBM.

"IBM is losing a lot of technology market and mind-share in the eyes of users," Nashoba's Bob Rosenbaum said.

But IBM has also become increasingly dependent on bitter competitors for products that are essential to success in the campus LAN environment. In addition to the Bay Networks and Sync deals, IBM is relying on Chipcom Corp. — acquired by 3Com Corp. — for intelligent hub technology and is working with Cisco Systems, Inc.'s Kalpana, Inc. for its 8272 Token-Ring switch.

"IBM is now beholden to its three closest competitors — Bay, Cisco and 3Com — as it attempts to compete in the campus networking market," said Anura Gurugé, an independent analyst based in New Ipswich, N.H.

Added Skip MacAskill, an analyst with the Gartner Group, Inc. in Stamford, Conn., "IBM is letting the competition take care of its installed base, which IBM has essentially ignored for the past 18 to 24 months."

Analysts said IBM looks more like a systems integrator these day than a network hardware and software vendor.

"IBM is losing a lot of technology market and mind-share in the eyes of users," said Bob Rosenbaum, vice president of sales and marketing for token-ring switch competitor Nashoba Networks, Inc.

Some customers agreed.

"If I want a Bay Networks switch, will I go to IBM? No. I want to deal with the vendor of the product, not an intermediary," said Ed Jones, manager of network services for Sara Lee Direct, a division of Sara Lee Corp. "IBM doesn't have much of an identity with us when it comes to networking products."

But last week's deals were certainly good for IBM's partners. Observers said Sync landed a plum in getting IBM to resell FrameNode. The FrameNode family includes the recently announced stackable 4200 model, which lets users consolidate Systems Network Architecture and LAN traffic over frame relay links.

One customer praised the Sync-IBM deal. "It will streamline our service and support," said Steve Lauretti, a senior systems engineer with The Travelers Insurance Co. located in Hartford, Conn.

IBM has pushed frame relay technology hard in the past couple of years, especially as an SNA-to-multiprotocol net migration option. Once upgraded to support frame relay, IBM products will be able to link directly with its ATM-based Nways switches and hubs.

IBM and Bay Networks announced an agreement to cross-market their token-ring switches and to do joint interoperability testing between their token-ring products. The agreement gives IBM a backbone switch for its token-ring family. Bay Networks gets to use IBM's 8272 to funnel workgroup traffic to the Centillion 100 switch.

But "Bay gets [the 8272] that doesn't support source route bridging and is architected as a cut-through switch — the complete opposite of the Centillion box," noted Gurugé. "There are going to be problems there."

According to Chadwick, the 8272 would be outfitted with source route bridging support early next year. ■

New UB switch on exhibit in science museum

By Jodi Cohen

Toronto

When Andy Rauer was told to build interactive science exhibits for a museum that displays leading-edge technologies, it only made sense to use the most advanced networking switch he could find.

But with limited funds, Rauer narrowed his choice down to one: UB Networks, Inc.'s first ATM switch.

Rauer, electronic media technologist at Ontario Science Center here, is one of the first users of UB's GeoSwitch/155 Asynchronous Transfer Mode device. The museum uses the GeoSwitch/155 ATM switch to showcase videoconferencing, whiteboarding and interactive CD-ROM technologies.

GeoSwitch/155 provides 16 155M bit/sec ATM ports and will be used by the museum on the campus backbone to switch between Ethernets.

Although he is just finishing up testing of the ATM switch and has not yet deployed it in the backbone, Rauer said he has already successfully run multimedia applications over ATM. And so far, he has not run into any problems.

See **UB switch,** ***page 16***

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*Circle Reader Service #***93**

Fore readies ATM for the masses

Planned software upgrade would bring ATM benefits to existing LAN applications.

By Michael Csenger
Pittsburgh

Fore Systems, Inc. this week will air a major initiative to help users run existing applications over ATM nets with many of the bells and whistles that only native ATM applications could otherwise enjoy.

The ForeThought ATM Internetwork Architecture extends ATM's quality of service (QoS) and other benefits to existing applications without requiring a complete swap-out to Asynchronous Transfer Mode technology.

With Fore's ATM scheme running at the core of a campus or enterprise net, features such as QoS can be tuned to guarantee bandwidth and meet other requirements for today's LAN-based applications.

The announcement is based on capabilities being added in Release 4.0 versions of Fore's ForeView and ForeThought networking software, set for release this fall.

The software will include standards-based LAN-Emulation (LANE) technology, but the overall Fore architecture goes well beyond what LANE provides.

Fore will also complement its software upgrades with new hardware releases designed to help users feed assorted net traffic types into ATM nets. These will include a family of ATM access multiplexers that provide connectivity for frame relay and other legacy traffic types (*NW*, Sept. 18, page 1) as well as Ethernet-to-ATM switches.

Not another fat pipe

Fore's architecture represents a significant move beyond the straight ATM networking that Fore has pursued until now and, conceptually, leapfrogs the switching strategies emerging from other vendors, according to analysts.

"Users today look at ATM and don't see much beyond what fast Ethernet can give them for less money," said Peter Sevcik, a principal with Northeast Consulting Resources, Inc. of Boston. "For most applications, ATM today is just a fatter pipe. But what Fore is talking about now is a quantum leap toward truly new networking functionality — it's not just a faster way of doing the same old thing."

By adding software hooks near the application layer of the networking protocol stack, Fore is using ATM as more than just a switching technology.

"The things that Fore is talking about are key issues that haven't really been discussed in the market yet," said Skip MacAskill, senior analyst at Gartner Group, Inc. in Stamford, Conn. "The major LAN vendors might be talking about running ATM, but none of them have talked about the kinds of software drivers that Fore is working on."

The only other vendor to address legacy application support over ATM in this way is Zeitnet, Inc., a maker of ATM adapter cards.

Fore parts

Fore's architecture is divided into four components.

Application Services tops off the scheme, reaching up to the socket layer that ties applications to the networking layers below. This will let Fore's adapters and switches recognize what type of application is requesting a link over the network and then establish links that best serve each application.

"If it's from a file-transfer application, we give it one type of connection. If it's terminal emulation, we will give it another because each application has different requirements and will affect the network differently," said Joe Skorupa, Fore's director of ATM switch marketing.

"The sooner you turn packets into cells, the sooner we can work with them."

Joe Skorupa

Fore's Application Services is being tested now and will be available in the first half of next year, he said.

ATM Transport Services includes essentially all of Fore's ATM networking capabilities, such as traffic management, coordinated across all elements of the network.

Virtual LAN Services is Fore's scheme for setting up virtual LANs, logical groupings of network users and devices that can be organized, regardless of their location.

The initial release this fall will organize VLANs by port and media access control address.

By the end of next year, the company will support designations by protocol type, host name and specific application, letting one user belong to multiple VLANs.

The final piece of the architecture, Distributed Routing Services, defines Fore's approach to the "route servers" that various vendors propose as a means to connect different virtual subnets across an ATM network.

Fore will use cut-through routing, based on the Open Shortest Path First (OSPF) protocol, to establish calls between subnets.

Early offering

By adding an awareness of ATM QoS parameters to OSPF, Fore is basically offering a pre-standard version of the Multi-Protocol Over ATM specification being drafted now by the ATM Forum.

Fore's ATM enhancements will ship as standard features with the Release 4.0 software and will be provided as a free upgrade to the firm's service contract customers.

©Fore: (412) 772-6600.

Mergers and acquisitions

Netscape eyes Collabra as way into groupware game

By Ellen Messmer
and Annmarie Timmins
Mountain View, Calif.

Netscape Communications Corp. last week said it will buy Collabra Software, Inc. to build a new line of products bringing groupware capabilities to Internet users.

Under the $108 million agreement, features of Collabra's groupware — including workflow and content filtering — will be integrated into future versions of Netscape's World-Wide Web browser and server software.

Observers said the deal could mark the start of a shake-up in the groupware market, which has found itself somewhat threatened by the Web's growing popularity.

While Lotus Development Corp. and other groupware vendors have moved to make their products Web friendly, it appears that Web vendors like Netscape are looking to make their products more competitive, too.

"The Web is missing features that groupware offers, like workflow and threaded discussion," said David Coleman, principal with San Francisco-based consultancy Collaborative Strategies, Inc. However, the Netscape-Collabra partnership has the potential to fill that gap, he said.

"Netscape seems to be declaring their intent to become a broad-based group systems provider, and they're acquiring one of the best user interfaces for navigating through continually changing information," said Tom Austin, research director at Stanford, Conn.-based Gartner Group, Inc.

Groupware synergy?

Collabra offers

- ▶ Well-regarded groupware client interface
- ▶ Existing ties to 'Net,
- ▶ Support for Lotus Notes and cc:Mail, Microsoft Mail, Novell's GroupWise, and Banyan's BeyondMail
- ▶ Management team with deep groupware background
- ▶ Low overhead client tool

Netscape brings

- ▶ Huge share of browser market
- ▶ Web server offering
- ▶ 'Net security expertise
- ▶ Support for key 'Net standards
- ▶ Good marketing base
- ▶ Money

While the recently announced Navigator 2.0 Web browser will not include groupware functionality, Netscape next year will release client and server software featuring groupware functionality and support for Internet standards, said Mike Homer, Netscape's vice president of marketing.

"Today, Collabra works over [Microsoft Corp.'s Messaging API] on top of existing mail systems," Homer said. "Collabra Share already has some connectivity to the Internet, but we intend to expand it to allow for full-text searches and summaries that utilize the Newsnet protocol and Simple Mail Transport Protocol."

New products could also let users manage Internet mail and Usenet lists in a groupware environment.

Netscape pledged to continue support for the current Collabra Share 2.0 product line.

Eric Hahn, Collabra's president and chief executive officer, said the new groupware-enabled Web products will challenge Notes, which is mainly used for corporatewide messaging. The Netscape-Collabra offerings should have more mass-market appeal because of their Internet links, he said.

Mike Zisman, vice president of Lotus' Communications Business Group, downplayed any threat that Netscape-Collabra poses to Lotus.

"The Web is great stuff, but I think people today are probably overestimating some of the things that will inherently be done in a Web browser," he said.

Zisman predicted that Notes and other such groupware applications will eventually contain Web protocols, enabling them to handle the functions of today's browsers.

The acquisition is expected to be completed in January.■

Group releases specs for videoconferencing standards

By Joanie Wexler
San Diego

Just because the videoconferencing system you bought is standards-compliant doesn't mean it will automatically communicate with others supporting the same standard.

But that will change soon if Versit, a four-member industry group, can help it. The group today will launch a set of specifications on the World-Wide Web assuring that any product based on the International Telecommunication Union H.320 standard for videoconferencing, audio conferencing and compression will work together.

Videoconferencing system vendors currently can select from more than 200 H.320 standard options in building their systems, explained Al Rosen, Versit managing director from IBM, one of the four Versit companies. But if the options do not overlap with those chosen by another manufacturer, "the two systems don't talk," he said.

This defeats the purpose of using H.320-compliant gear to conduct electronic conferences with business partners or customers, Rosen said.

See **Video specs**, *page 16*

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Circle Reader Service **#99**

Cabletron revitalizes core hub line

By Jodi Cohen
Atlanta

Cabletron Systems, Inc. customers will soon be able to breathe new life into their MMAC hubs with a switching module that performs 15 times better than the company's existing ones.

The new Multi Media Access Center SmartSwitch module will boast a forwarding rate of 750,000 packet/sec and support as many as 16,000 media access control addresses. The MMAC chassis — introduced in 1988 and installed in 85,000 customer sites — previously supported only a six-port Ethernet switching module that handles just 50,000 packet/sec.

The new switch module will be unveiled at NetWorld+Interop this week as part of an anticipated line of SmartSwitch products, which will also include modules for the higher end MMAC-Plus switching hub as well as Cabletron's first stand-alone workgroup switch. All the new devices will be based on Cabletron's next-generation Application Specific Integrated Circuit technology (*NW,* Aug. 28, page 1).

The new MMAC module will support Ethernet. Later, Cabletron will introduce token-ring, Fiber Distributed Data Interface, fast Ethernet and 100VG-AnyLAN support through smaller interface cards that plug into the module.

John Hoag, vice president of systems at Sage Clearing, Ltd. in San Francisco, said the new module will allow him to preserve his investment in 10 MMACs, rather than being forced to upgrade to the MMAC-Plus.

"Now I don't have to throw out my MMACs because they are too slow and buy the latest and greatest product from Cabletron," Hoag said. "I can migrate to the newest switch technology using my existing equipment."

Ken Cieszynski, staff engineer at United Air Lines, Inc. in Chicago, said the new modules will eliminate the need for him to upgrade his MMACs anytime soon. "And that means we save big bucks since we have about 100 chassis deployed," he added.

SmartSwitch specs

The new Cabletron switches will:

- Handle 750,000 packet/sec
- Support as many as 16,000 MAC addresses
- Be based on next-generation ASIC technology
- Support SecureFast Virtual Networking
- Be available in the next six months

Users should have plenty of room to add the new modules to their MMACs, since very few are pushing the limits of their chassis. According to Cabletron, 40% to 45% of existing MMAC slots are vacant.

While some users said the faster switches are overkill for their current net environment, others said they are eager to get their hands on the new module.

Sage Clearing, a financial firm, could use the increased performance that next-generation switching will allow, Hoag said.

The company needs to transfer large amounts of data at high speeds between servers and between servers and workstations, he said.

"In our industry, even a millisecond delay in stock updates can change a quote," Hoag said. "Obviously, we need as fast a throughput as we can get."

By deploying the switch in the hub, he can maintain the redundancy, manageability and hot-swappability of his hub environment.

Stand-alone switching

Cabletron's new SmartSwitch module for the MMAC will also be available as a stand-alone switch that will fill in the product gap between the high-end MMAC-Plus and the MMAC chassis.

The stand-alone switch will use the same board as the switch module for the MMAC but in a nonchassis form factor. Analysts said that by offering the switch as a stand-alone device, Cabletron will attract new customers by offering a product that will compete with Bay Networks, Inc.'s 28000 and Cisco Systems, Inc.'s Catalyst devices.

Like the firm's existing switch modules, the new switches will support Cabletron's SecureFast Virtual Networking capabilities.

Pricing for the new products has not been set. All products will ship in the next six months.

©Cabletron: (603) 332-9400.

Sprint set to give frame relay users ATM hookup

By David Rohde
Atlanta

Sprint Corp. this week will unveil the first commercial frame relay-to-ATM service interworking arrangement, a move expected to bring new users to the ATM table.

NETWORLD+INTEROP

The offering — based on an interworking standard recently ratified by the ATM and Frame Relay Forums — will be pitched to managers of large frame relay networks seeking to create a high-bandwidth backbone tier above their branch office sites.

Many such users are interested in establishing a handful of hub sites on their enterprise WANs that can exchange traffic among themselves over T-3 ATM links, while at the same time maintaining frame relay permanent virtual circuits with dozens of smaller sites, said Brad Hokamp, Sprint's director of advanced data services.

Cathy Gadecki, Sprint's group manager for ATM services, noted: "Of the existing frame relay customers, they list frame-to-ATM interworking as the No. 1 requirement."

Such traffic requirements especially tend to arise at companies where frame relay nets consist of hundreds or even thousands of nodes.

Sprint has captured a number of these sites, including the world's largest frame relay network — which is run by Electronic Data Systems Corp. for System One Corp. — an airline reservation system used by nearly 8,000 travel agencies (*NW,* Sept. 11, page 1).

Under the service interworking arrangement, to be made generally available in November, Sprint will perform conversion of data packets from frames into ATM cells within its AMS 5001 ATM edge switches from Hitachi, Ltd.

The new service interworking standard, known as FRF.8, was ratified by the Frame Relay Forum on Aug. 29. As a result, AT&T, MCI Communications Corp. and other carriers are considered likely to soon follow Sprint's lead.

According to the forum, FRF.8 allows communication between a frame relay end device and an ATM end device without either knowing the protocol had been translated. And it provides for bidirectional network management.

In Sprint's net, Gadecki said the Hitachi switches will perform such functions as translation of network addresses and even conversions between higher level protocols. None of these activities results in any noticeable latency or performance degradation, she said.

The Sprint officials cautioned that inserting an ATM backbone into a frame relay WAN does not, by itself, add any of ATM's multimedia application support capabilities to frame relay's bursty data handling functionality.

And for users whose traffic characteristics do not lend themselves to a multistar configuration with high-traffic hubs, Hokamp said there is no reason why frame relay alone cannot handle even larger corporate networks than it has so far. ■

Digital introduces Windows NT version of Polycenter

Enhances Manageworks LAN administration tool to run on Windows NT and Win95.

By Jim Duffy
Maynard, Mass.

Working to lower the cost and widen the reach of its management software — and give its Alpha hardware another push — Digital Equipment Corp. last week unveiled a Windows NT version of its Polycenter Manager on NetView product.

At the same time, Digital rolled out a new version of its workgroup manager for multivendor network operating systems that supports Windows NT and Windows 95, among other features.

The new Polycenter Manager on NetView for Windows NT is a port of Version 3.0 of Digital's Unix-based Polycenter Manager on NetView. The Windows NT version costs $6,995, while the Unix version costs about $15,000.

"We're putting out 120 remote sites, and it's all NT-based [clients and servers]," said Mark Halley, network manager at the Florida House of Representatives. "It's easier to find something to put on top of NT than try to train a staff on Unix."

Polycenter Manager on NetView for Windows NT runs on Intel Corp. and Digital Alpha hardware.

The product is integrated with Microsoft's Systems Management Server inventory management and software distribution product as well as Digital's Assetworks package.

Digital claims that 40 vendors in the NetView Association are "committed" to Windows NT, and that eight third-party applications are now available for the platform.

Polycenter Manager on NetView for Windows NT is now shipping. Digital will release an upgrade next year including the client/server implementation, event correlation and multiple database support available now in Version 4.1 of the Unix-based Polycenter product.

Meanwhile, Digital also announced Version 2.2 of its Manageworks LAN administration tool. That product now runs on Windows NT and Windows 95, in addition to Windows 3.1 and Windows for Workgroups.

Digital also will make the product available on Alpha workstations, along with the Intel machines it already supports. And the software can now send Simple Network Management Protocol traps to enterprise-level platforms.

Manageworks 2.2 costs $995 and will ship Oct. 9.

©Digital: (800) 344-4825.

Digital management expansion

Polycenter Manager on NetView for Windows NT

- Port of Unix-based Polycenter Manager on NetView 3.0.
- Windows 95-style user interface.
- Works with Microsoft's Systems Management Server and Polycenter Assetworks.
- More than 40 Windows NT application developers in NetView Association.

Manageworks 2.2

- Support for Windows 95 and Windows NT, as well as Alpha hardware.
- Works with DOS and Windows applications.
- Integration with enterprise management systems.
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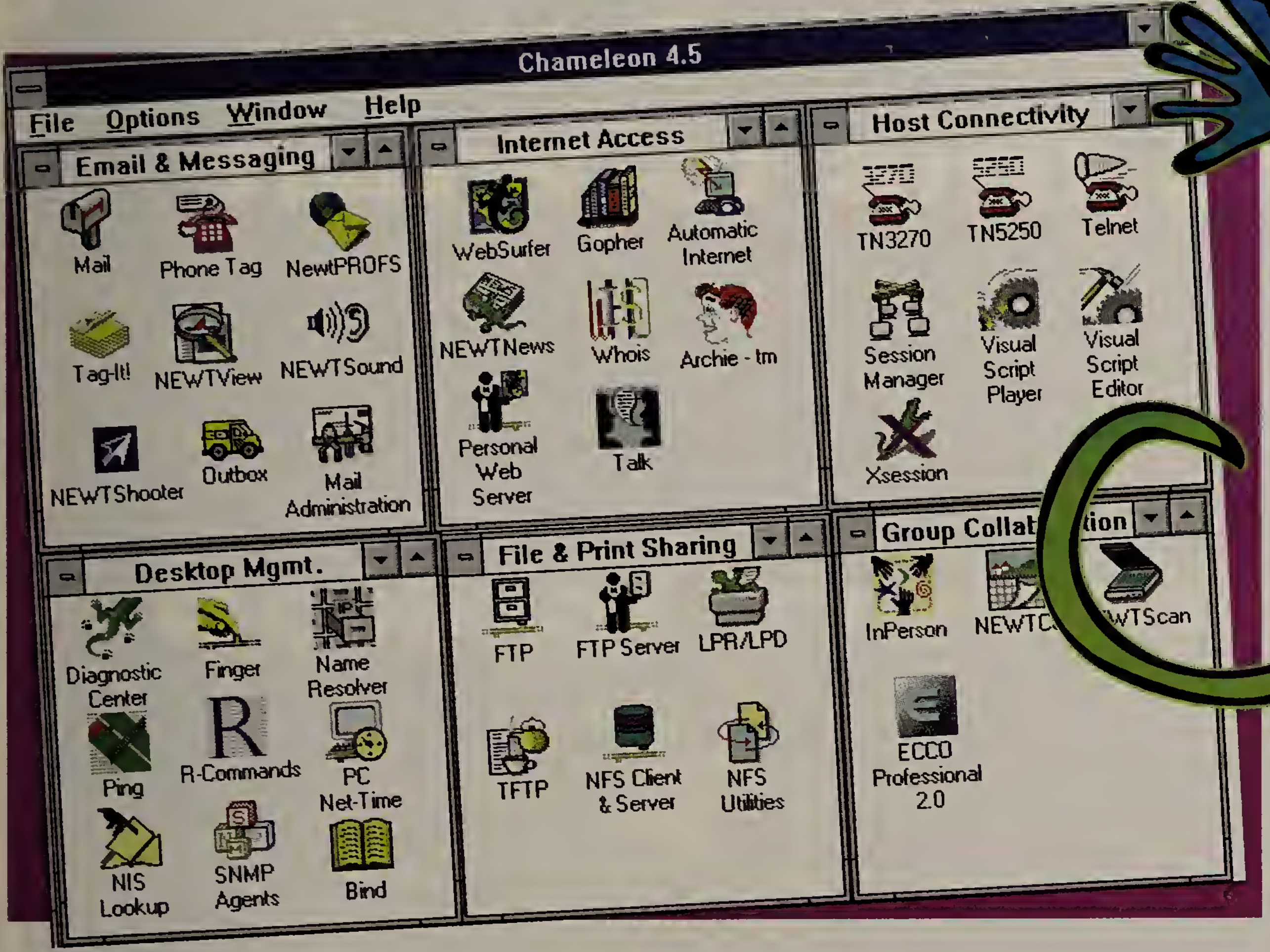

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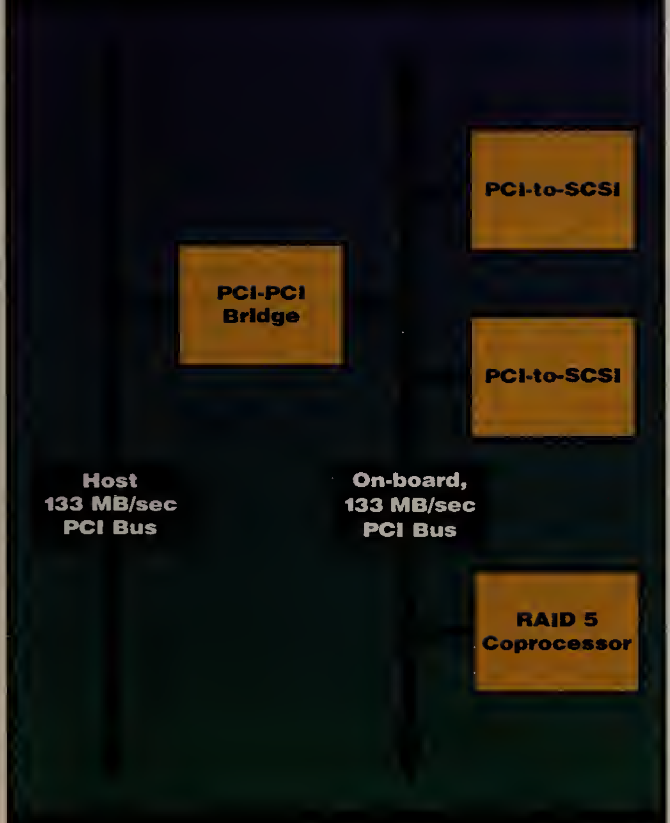
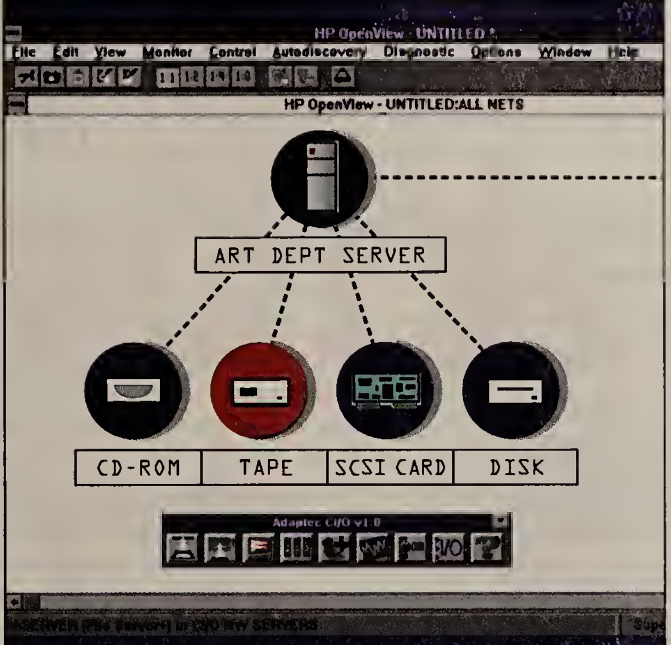


Adaptec PCI RAID adapters provide a direct data path between SCSI devices and host memory.

Adaptec CI/O Software



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Circle Reader Service #76

Microsoft sells its Mac E-mail pack

StarNine Technologies scoops up the company's Microsoft Mail for AppleTalk software.

By Annmarie Timmins

Microsoft Corp. last week sold the AppleTalk version of Microsoft Mail to StarNine Technologies, Inc., relinquishing control of a product users said Microsoft has long neglected.

Terms of the deal, which netted StarNine about 750,000 users, were not released.

StarNine, known best for its Apple Computer, Inc. Macintosh gateway products, will try to get on the good side of customers soon. It plans to ship an enhanced release of Microsoft Mail Server for AppleTalk Network under the name StarNine Mail in the first quarter of 1996. The electronic mail package will include a Unix-to-Unix Copy gateway for improved Internet connectivity and interoperability with other E-mail systems.

Greg Levin, lead product manager for Microsoft, said customer demand for improved Internet connectivity and continued support on the PowerPC platform prompted Microsoft to unload the AppleTalk-based E-mail package. "The best way to deliver that was to find a partner," he said. StarNine will have full control of the product, although Levin said the two companies will work together to ensure that StarNine Mail is compatible with Exchange and the PC version of Microsoft Mail.

Step in right direction

Users and analysts cheered the move. "Microsoft has not supported their PC or Mac [electronic mail] product very well," said Byron Jones, systems manager with the University of Miami, where some students are using the AppleTalk version of Microsoft Mail. "We have been using it for three years and there have been no major upgrades. [Recent releases] have primarily been bug fixes."

StarNine's support "really can't get any worse" than that of Microsoft's, he added.

Dan Blum, an analyst with Rapport Communication, said the deal was a good opportunity for both StarNine and Microsoft.

"This enables Microsoft to get out of the business," he said. "They are not all that interested in supporting AppleTalk or the legacy Microsoft Mail product."

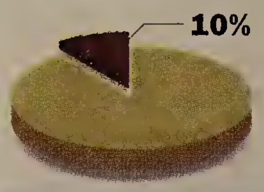
According to Blum, Microsoft is more interested in Exchange, its next-generation messaging product. StarNine will lend greater support and development efforts to Microsoft Mail.

John Wimer, director of operations at Norian Corp., a medical equipment company in Cupertino, Calif., used Microsoft Mail for AppleTalk nets for about 18 months before dropping it in favor of its biggest competitor, QuickMail from CE Software, Inc.

Wimer complained of marginal support from Microsoft and the limited functionality of the product, which he said has no spelling dictionary and does not allow users to move easily between applications. With QuickMail, users can switch between a word processing application and E-mail with two keystrokes.

According to Jones, his Macintosh end users do not have the same features as their colleagues using the PC version of Microsoft Mail. For example, PC users can send faxes from their desktop, much like an E-mail message, while Macintosh users cannot. ■

About 10% of Microsoft Mail users run the software across an AppleTalk network, according to Eric Arnum, editor of "EMMS," an industry newsletter.



Lotus, Intel help Notes users get real

By Annmarie Timmins

Cambridge, Mass.

Lotus Development Corp. wants to make Notes the one application that does it all for users by bundling into Notes 4 new data conferencing capabilities and a browser that lets users jump between Web sites and Notes with ease.

Lotus last week began shipping RealTime Notes, which integrates Intel Corp.'s ProShare standards-based data conferencing technology into Notes, allowing users to collaborate on documents in real time across a network without exiting their Notes desktop.

No need to leave

The World-Wide Web browser planned for Notes 4 is expected next year, not with the first iteration of the product, which is due at the end of this year. With the browser, Notes users will be able to read information on the Web without leaving Notes. Currently, users must exit Notes and use a browser, such as Netscape, to cruise Web sites.

The Web browser will also let users pull information from Web sites into Notes databases. The InterNotes Web Publisher lets users publish data from Notes databases to the Web but offers no way of moving data in the opposite direction.

"The closer you are to the user, the more influence, power and popularity your product has," said David Coleman, principal at Collaborative Strategies, Inc. in San Francisco. "Lotus wants to keep users in Notes at all times. They want to enable them to connect to any data source while staying in Notes."

With RealTime Notes, users can work on a memo or Notes application at the same time, regardless of where they are. However, only two sites can be supported at a time, and the video capabilities of ProShare will not be bundled into Notes. It will, however, be available as an upgrade that can be easily integrated with RealTime Notes, said Chris Herot, director of advanced technology at Lotus.

Before long, RealTime Notes will be available over AT&T's Network Notes, according to industry analysts.

Network Notes puts Notes on AT&T's public network, giving customers access to Notes without the associated administration worries. Mark Gibbs, a consultant in Ventura, Calif., said there is already a demand for video and document collaboration over the Internet, but the bandwidth has never been there to support it. AT&T, he said, can give users all the bandwidth they would need to handle data — or video, if they upgraded — through Network Notes.

"The closer you are to the user, the more influence, power and popularity your product has," said David Coleman of Collaborative Strategies.

Jeff Papows, Lotus' vice president of communications products, said the integration of ProShare and Notes will give users a central desktop application for both messaging and real-time collaboration. The technology will be given to Notes 3 customers for free until the end of the year. It eventually will be bundled into Notes 4.

IBM will offer ProShare on OS/2 through a port and work with Intel to market it, said Ozzie Osborn, IBM's general manager of Commercial Desktop Systems.

Notes users wanting ProShare will get a CD that contains ProShare, a set of Notes applications and a set of components to build their own Notes/ProShare applications.

There will be tight integration between Notes and ProShare, according to Herot. For example, Notes users can initiate a ProShare call from their address books just by clicking on a name. There will also be a conference-enabled mail form that will allow users to call back the mail sender by clicking on a single button.

Sarah Dickinson, an analyst with Personal Technology Research, used RealTime Notes and said she liked the VideoMail, which acts like an answering machine if a user is on a ProShare call when another call comes in.

In other news, AT&T will annouce at this week's NetWorld+Interop a new pricing plan and service upgrades for Network Notes. No further details were available.

Lotus will also annouce that the X.500 directory standards technology it licensed from Unisys Corp. for the Lotus Messaging Switch (LMS), a server-based switch that ties together different E-mail systems, is headed for beta.

Lotus would not comment on the announcement.

©Lotus: (617) 577-8500.

Net switches

Vendors to cover the WAN- to LANscape with announcements

By Tim Greene

Atlanta

At NetWorld+Interop this week, switch makers will be showing off new products that range from the enterprise right up to the carrier backbone.

Hughes Network Systems, Inc. will announce a mid-range backbone access switch, filling a key gap in its enterprise networking product line.

The Hughes S8000-5 is the larger, five-slot version of the company's S8000-2 switch and offers access to frame relay and X.25 networks at T-1/E-1 speeds.

Available now, the switch is designed for consolidating branch office traffic before switching it into the wide-area public or private network. It can also switch traffic among branch offices.

The switch gives network access to a large variety of traffic, including IP, IPX, NETBIOS, SNA/SDLC, bisynchronous and asynchronous, said Martin Dintzis, an analyst with Datapro Information Services Group.

Thomas Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J., said the switch is part of a very flexible Hughes network strategy that relies on switched virtual circuits for wide-area links.

As deregulation of carriers alters the price of lines, these switches will let users tap the most economical solution: Asynchronous Transfer Mode, frame relay or X.25, Nolle said.

Hughes' S8000-5 switch can be fitted with Ethernet/token-ring and frame relay modules, and comes in three configurations: up to 24 serial ports, 16 Ethernet ports and four token-ring ports; up to 36 serial ports, four Ethernet ports and a single token-ring port; and 40 serial ports.

Prices range from $13,000 to $56,000.

NEC chimes in

In other news, NEC America, Inc. is announcing the AtomNet line, which consists of a carrier ATM backbone switch, a smaller ATM switch for use as an edge switch in a public net or a backbone switch in a private network, and a network management system.

The NEC AtomNet/M20 backbone switch supports throughput from 10G to 160G bit/sec. It features T-1, OC-3c (155M bit/sec) and OC-12c (622M bit/sec), and is shipping now.

The AtomNet/M7 supports throughput from 5G to 10G bit/sec. It can support up to 64 input interfaces, including frame relay, circuit emulation and ATM. Port speeds are OC-3c, OC-12 and T-3 ATM.

AtomNet Network Management System allows a view of the entire network and supports fault, configuration, accounting, performance and security monitoring. ■

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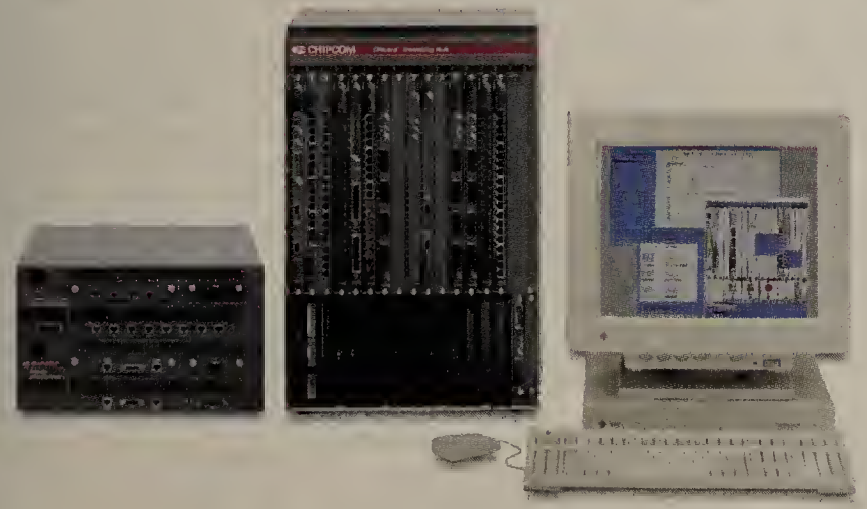

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*Circle Reader Service #***54**

Sun brightens up distributed objects

By Kevin Fogarty and John Cox

New York

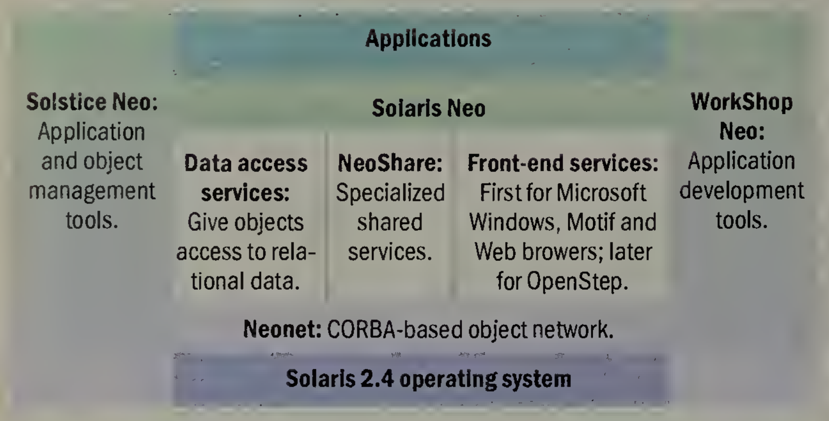
SunSoft, Inc. last week introduced its long-awaited Distributed Objects Environment technology with a new name and a new game plan.

Neo is a line of tools and network services that let corporations develop applications faster, change them more readily and help them conduct business across the World-Wide Web more easily, according to Scott McNealy, chairman and chief executive officer of SunSoft's parent, Sun Microsystems Inc. of Mountain View, Calif.

Objects built with and managed by Neo will be accessible via Motif and Windows clients, as well as via the 'Net from Web browsers and applications built with Java, SunSoft's development language for interactive Web-based applications.

The combination of Neo and Java lets corporations build Web pages that work with server-based ob-jects and existing relational databases.

SUNSOFT'S NEO PRODUCT LINE


Applications
Solstice Neo: Application and object management tools.
Solaris Neo
WorkShop Neo: Application development tools.
Data access services: Give objects access to relational data.
NeoShare: Specialized shared services.
Front-end services: First for Microsoft Windows, Motif and Web browers; later for OpenStep.
Neonet: CORBA-based object network.
Solaris 2.4 operating system

Neo gives corporate developers a full set of tools and services to build, run and manage distributed object applications. SunSoft originally created Neo links to legacy relational data and recently incorporated access for Internet Web browsers.

GRAPHIC BY TERRI MITCHELL

SOURCE: SUNSOFT INC., MOUNTAIN VIEW, CALIF.

"We are taking an enterprise object environment and extending it over the Internet in a way that lets you get data close to customers," McNealy said.

The Neo architecture has been carefully thought out, according to analysts and users. Sun also has delivered an advanced set of network services, called NeoShare, that handle such tasks as activating and deactivating objects. There is a suite of application development tools for building distributed objects and an array of administrative tools for managing them.

Room for improvement

But they also agreed that Neo has a ways to go before becoming a first choice for key business applications. "Sun has built in some impressive capabilities. On the other hand, it's a Version 1.0 product," said David Smith, a research director with Gartner Group, Inc., a market research firm in Stamford, Conn.

One beta user, citing a company policy requesting anonymity, said Neo offers an excellent implementation of the network services specified in the Object Management Group's Common Object Request Broker Architecture (CORBA), such as naming and object persistence.

Beyond this, he said, SunSoft has created powerful new services that will be needed in large-scale, line-of-business applications. Object-oriented communications is typically synchronous — both client and server objects are, in effect, put on hold while the server responds to a client request.

"Because of this one fact, we don't feel that in a distributed object environment, the [synchronous] model will scale in high volumes," the user said.

By contrast, Neo's event service supports asynchronous connections — a simpler, more efficient model. The event service also enables developers to use multicasting and broadcasting communications, such as sending a stock ticker data feed to multiple networked objects.

The Neo product line has three main parts (see graphic). One is Solaris Neo, the operating or run-time environment for Neo applications. Solaris Neo is compatible with SunSoft's Solaris 2.4 operating system and runs in conjuction with Solaris nets. In the initial release, Solaris Neo will comprise Neonet, a CORBA-compliant ORB and related services, and Neoshare, which provides advanced object services.

The next Neo release, due to hit beta tests during the fourth quarter, will include NeXT Computer, Inc.'s OpenStep run-time environment for object-oriented desktop applications and Neodesktop, a desktop user environment based on OpenStep.

The second part, bundled with Solaris Neo, will be Solstice Neo, a set of object administration tools for managing the object network.

The third part is WorkShop Neo, a version of SunSoft's WorkShop development tool set. WorkShop Neo initially will include Neoworks, a set of tools for building CORBA object applications, and SPARCworks, which will include an array of tools for building and debugging distributed applications.

In Neo's next release, WorkShop Neo will incorporate NeXT's OpenStep Developer, a set of tools for building distributed applications from reusable components.

The first release of the Solaris Neo product line, due in October, will include Neonet and NeoShare, plus a bundle of Solstice Neo administration tools, for $990.

WorkShop Neo prices start at $11,995, but the offering will ship for a short time for a promotional price of $5,995.

✆SunSoft: (512) 345-2412.

Video specs

Continued from page 8

On the other hand, locking vendors into a common implementation set defeats the purpose of giving them room to differentiate themselves with the myriad options, said Al Lill, vice president and research director of multimedia at Gartner Group, Inc., a consultancy in Stamford, Conn. He also said that the standards bodies early next year will have completed their work on H.320, potentially usurping Versit's H.320 Implementors' Agreement effort.

Versit — last fall formed by Apple Computer, Inc., AT&T, IBM and Siemens Rolm Communications, Inc. — will release its specs not only to the public over the Internet, but also to videoconferencing standards groups, such as the Personal Conferencing Working Group and the International Multimedia Teleconferencing Consortium.

AT&T WorldWorx services and the IBM Global Network will be among the first Versit-compliant videoconferencing offerings, Versit officials said.

As of today, users and vendors will be able to download the H.320 implementors' spec from the Versit Web home page at http://www.versit.com.

As of today, users and vendors will be able to download the H.320 implementors' spec from the Versit Web home page at http://www.versit.com.

The group intends to develop implementors' specs for T.120 standards, the data conferencing portion of the H.320 standard down the road, said Larry Jacobs, Versit managing director at AT&T.

Not just conferencing

Versit has been working behind the scenes to fill in niggling interoperability gaps among a variety of equipment types that suddenly need to talk to each other as the computer and communications worlds collide.

The group's work has included the Personal Data Interchange specification for allowing users' personal organizers to exchange information and the Universal Network Port, a common connector for linking any device to any network.

Meanwhile, the group intends to have interoperability specs for computer-telephone integration in draft form by the end of the year. They will include an API and protocol information, and will feature definitions for linking desktops, servers and hosts to telephone switches, Jacobs said. ■

UB switch

Continued from page 6

"A lot of the challenge was becoming familiar with the ATM technology," he said. "Once you get over that hump, getting the box up and running was quite straightforward."

Rauer said he was especially impressed with the quality of video applications over ATM and is using the technology temporarily in the museum's multimedia lab to provide videoconferencing and whiteboarding between desktops.

While internal ATM applications are the initial focus, Rauer said he hopes UB will offer a future wide-area ATM connectivity option for the GeoSwitch/155.

In fact, the museum staff already has several ideas about how to show off an ATM link out of the building. For instance, Rauer is planning an exhibit, dubbed the interactive theater, which will require an ATM link from the museum to a remote location and a large projection screen at both those buildings.

"We could showcase the ATM technology by creating a life-size videoconference," he said. "It would be as if the people in front of each screen were standing right next to each other."

According to Rauer, he is excited about the capabilities ATM will bring to his network and said that the decision to implement ATM was easy.

"We chose ATM because the whole idea of the Ontario Science Center is to show the newest leading-edge technologies," he said. "FDDI is great, it's fast, and it's certainly a better backbone solution in the short run, but ATM is the future."

Rauer also pointed out that price was a key concern when choosing the GeoSwitch/155 and a key reason for going with UB equipment, since the museum is a publicly funded organization.

"We've got a new government in this province, and they're cutting left, right and center, so we didn't have a lot of funds to work with," Rauer said. "UB offered us a proposal that fit within our budget."

UB sells the ATM device for $955 per port. ■

RealityCheck

Product
GeoSwitch/155

Company
UB Networks

The benefits
▲ Easy to install.
▲ Test applications on multiple platforms work well.
▲ Video application quality is excellent.
▲ Can be used in either the backbone or workgroup.

The drawback
▼ No wide-area ATM interface.

The user view

"We like UB's GeoSwitch because it gives us the ability to showcase ATM technology using videoconferencing and other multimedia applications."

Andy Rauer

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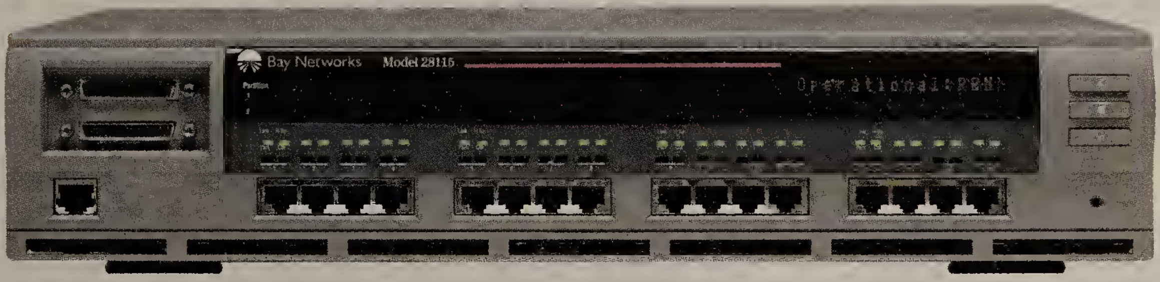

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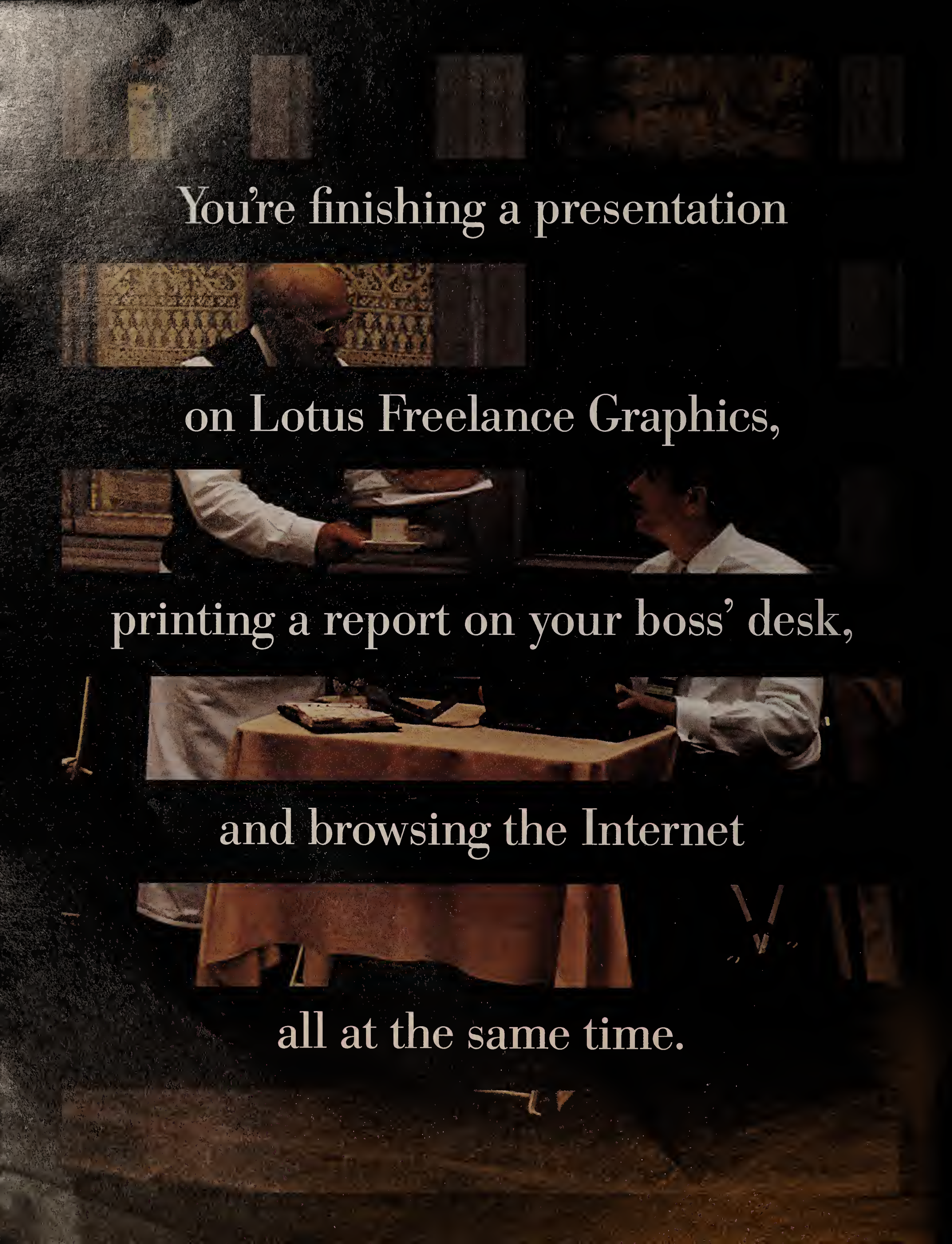
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Briefs

■ **IBM** *last week announced a NetView Distribution Manager (DM) software distribution agent for Apple Computer, Inc. Macintosh-based workstations. The* **NetView DM Agent for Macintosh** *will let Macintosh users receive software updates and files from a centrally located NetView DM for AIX server across TCP/IP links.*

The agent code will be available this week for $99.

IBM: (800) 426-4968.

■ *Following the lead of Northern Telecom, Inc., wireless manufacturer* **Ericsson, Inc.** *unveiled a* **campus wireless telephone system** *operating in the unlicensed personal communications services (PCS) band.*

The Freeset 1900 — named to refer to the 1920- to 1930-MHz unlicensed portion of the PCS band — will be delivered in the second quarter of 1996 if approved by the Federal Communications Commission.

*Nortel's Companion PCS system has already been approved for U.S. delivery (*NW*, Aug. 28, page 19).*

Ericsson: (800) 374-2776.

■ *Separately,* **Northern Telecom, Inc.** *introduced Release 2.0 of its Messenger* **unified messaging system,** *supporting integration of Meridian Mail voice mail with E-mail platforms from Microsoft Corp. and Lotus Development Corp.*

Messenger 2.0 provides screen-based E-mail, voice and fax message management, utilizing Microsoft's Messaging Application Programming Interface for the Windows environment. Messenger users at first will be able to manage Microsoft Mail messages, and Nortel has plans to support Microsoft Exchange clients, as well. On the Lotus side, Nortel is supporting Lotus' Integrated Messaging architecture via the Common Messaging Calls protocol.

General availability of Messenger 2.0 is slated for December at a cost of $75 to $350 per mailbox.

Nortel: (800) 466-7835.

Bank solves SNA/LAN issues in record time

APTNet pack integrates 43 branch offices in about a month.

By Michael Cooney

Reno, Nev.

Bigger, better, faster, more.

Those were the themes American Federal Savings Bank had in mind as it rushed to link its 43 remote branch office LANs and install new software distribution and file-transfer capabilities — all employing the bank's existing Systems Network Architecture backbone.

"In a little over a month, we had to have a system in place where we could easily add new users, send files around the enterprise and do software distribution — all with a three-person IS staff and a directive not to increase telecom costs," said Fred Wilson, network systems administrator and senior MIS analyst for American Federal.

"The driving element behind the new network was to eliminate the old terminal-to-mainframe financial applications and replace them with new distributed client/server-based LAN applications," he added.

The bank turned to Automated Programming Technologies, Inc., an SNA software development firm based in Bingham Farms, Mich. The firm's APTNet software lets the bank link its branch office LANs over its existing SNA backbone without having to install branch office routers or adding other backbone protocols, such as TCP/IP.

"Most of our traffic now is IPX, and we have a small amount of SNA, but we get to retain our existing WAN products," Wilson said.

APTNet is a software package with three components: software on each client PC on the LAN, code that runs on the LAN server and a component that runs as a VTAM application on the mainframe. It works by encapsulating LAN traffic between the server and the mainframe through a proprietary APTNet protocol, letting the LAN traffic run on top of the underlying SNA net.

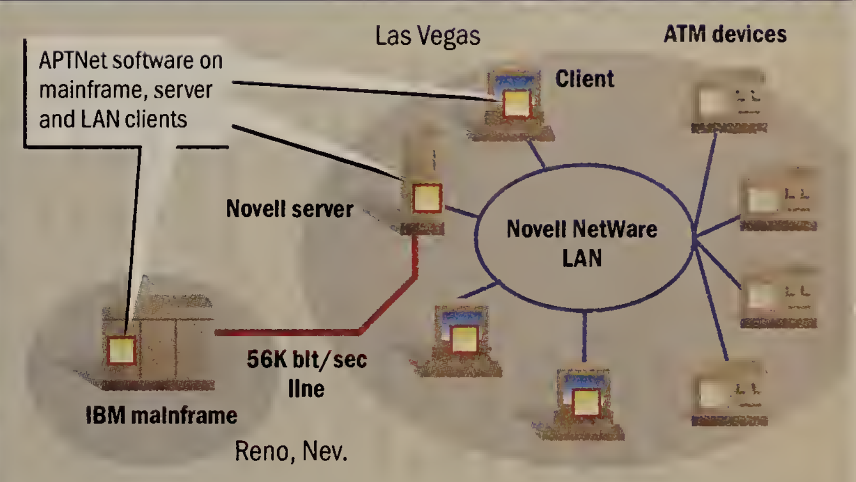
In American Federal's case, each of the 43 branch office LANs is outfitted with a Novell, Inc. NetWare server running APTNet.

"Without APTNet, we would have had to install a separate TCP/IP-based WAN and routers, which we found to be too costly," Wilson said.

The company looked at a number of branch office solutions, including Cisco Systems, Inc.'s routers, Novell's SNA Links software and IBM's LAN-to-LAN over WAN program, but

See **SNA/LAN,** *page 30*

Without a router in sight



American Federal Savings Bank is using APTNet software from Automated Programming Technologies to tie together 43 branch office LANs over its existing SNA backbone.

GRAPHIC BY SUSAN J. CHAMPENY

Follow-me telephone options proliferating

By Tim Greene

As cellular telephones proliferate and personal communications services start to develop, users are demonstrating their desire to be reachable anywhere, anytime.

One result is a swirl of activity among providers of one-number, follow-me services, with highlights including:

- Sprint Corp. just recently launched its Total Number service in Las Vegas.
- Priority Call Management, Inc. announced last week new capabilities to its renamed Oryx platform.
- Wildfire Communications, Inc. announced three alliances with start-ups that want to sell a service based on the Wildfire platform.
- Telecommunications Premium Services, Inc. (TPS) is currently negotiating with PBX vendors, three regional Bell operating companies and an interexchange carrier to market services based on the TPS platform.

What started as straightforward offerings, such as BellSouth Corp.'s ProLink that forwards calls from a single number to other numbers according to a call routing list, have blossomed

See **Follow-me,** *page 30*

No need to wait until 2001

This is a sample dialog between a user at a pay phone and Wildfire's voice recognition call management platform:

User: Wildfire.

Wildfire: (female voice) Here I am.

User: Call.

Wildfire: Call whom?

User: Susan Watson.

Wildfire: At which place?

User: Car.

Wildfire: Dialing.

...Conversation with Watson...

User: Wildfire.

Wildfire: They hung up. What can I do for you?

User: Find.

Wildfire: Find what?

User: New messages.

Wildfire: I found one new message from Mike Richards.

User: What's it say?

...Voice message left by Richards...

AT&T seeks discounts for Uniworld users

By David Rohde

New York

AT&T is trying to get the Federal Communications Commission to allow the same network services discounts routinely enjoyed by large users to apply to new global services that include circuits between foreign countries.

These discounts are critical if AT&T wants to attract users to Uniworld, the joint venture between it and four European carriers. Uniworld will shortly unveil its International Virtual Private Network (IVPN) service spanning 17 countries (*NW*, Aug. 21, page 1).

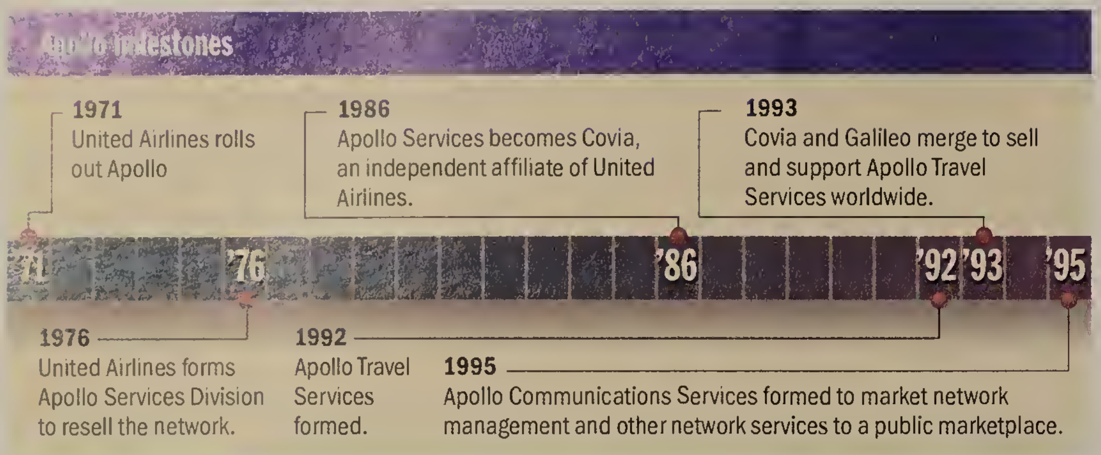
Uniworld IVPN and similar services from the Concert venture between MCI Communications Corp. and British Telecommunications plc incorporate circuits among many countries into a network platform with transparent features. These services offer a single bill that is paid in dollars.

Ordinary international services — those involving circuits between the U.S. and other countries — are routinely discounted as part of large AT&T users' Tariff 12 and contract tariff deals. But at the moment, U.S. carriers do not have authority to offer such special arrangements on circuits between two foreign countries, even as part of a seamless global offering.

"We're getting asked about this all of the time, but it is not just up to AT&T," said John Finnegan, AT&T's director of global strategy development, to a gathering of users here earlier this month. "We have to work through our regulatory authorities."

Behind the scenes, AT&T is planning to attack the issue first for its approximately 200 Tariff 12 customers, said Hank Levine, a partner in the Washington, D.C. law firm of Levine, Blaszak,

See **Discounts,** *page 35*


Apollo milestones
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'76
'86
'92
'93
'95
1971
United Airlines rolls out Apollo
1976
United Airlines forms Apollo Services Division to resell the network.
1986
Apollo Services becomes Covia, an independent affiliate of United Airlines.
1992
Apollo Travel Services formed.
1993
Covia and Galileo merge to sell and support Apollo Travel Services worldwide.
1995
Apollo Communications Services formed to market network management and other network services to a public marketplace.

New software to help handle large-volume TCP/IP networks

By Michael Cooney
Rolling Meadows, Ill.

Apollo Communications Services (ACS) this week will announce a software package that will help users more efficiently handle large TCP/IP nets.

The Internet Protocol Concentrator (IPC) is designed to concentrate large volumes of TCP/IP sessions onto one link to a mainframe, saving line charges and improving response times and reliability of host-TCP/IP links, the company claimed.

"The driving idea behind the new IPC is to keep net failures and their impact on users to a minimum," said John McIntyre, vice president and general manager of ACS. "If there is a failure in a mission-critical TCP/IP net, users must be able to reestablish connectivity in seconds, not minutes."

IPC is a software package built to run on IBM's AIX operating system on the RISC System/6000 workstation. IPC concentrates thousands of TCP/IP sessions through a single pipe to TCP/IP resources on a mainframe. The RS/6000 can connect to a mainframe either via traditional bus and tag cables or via IBM's fiber-based Enterprise Systems Connectivity interface.

"Think of the IPC as a front-end processor for TCP/IP sessions," McIntyre said.

"The number of sessions IPC can support is limited only to the size of the RS/6000," said Mary Renton, manager of network systems for ACS.

"We've seen anywhere from 5,000 to 8,000 messages per second pass though one RS/6000 running IPC," Renton said. "In environments where there are multiprocessor mainframes, ICS can also distribute the workload among the least busy processors.

"The IPC can also off-load TCP/IP processing entirely from the mainframe, reducing expensive mainframe cycles," she said. Included in the package is a network management feature that enables users to see the connection status of all host sessions.

IPC is designed to be daisy-chained with other IPC-based processors so that in the event one fails, a second IPC will pick up the lost sessions.

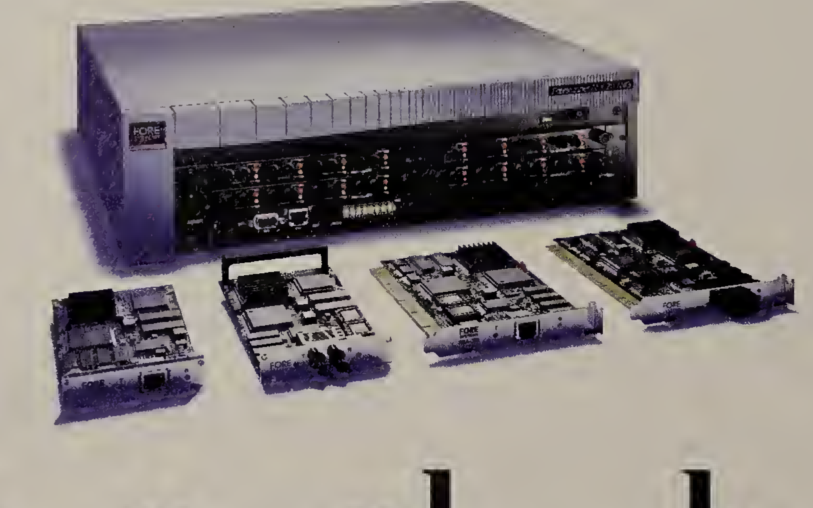
The ACS program is available this month for $100,000. Enterprise licenses for multiple machines are also available.

While IPC is ACS' first publicly available product, it comes from a long line of unique communications products built for its parent company, Apollo Travel Services. ACS is a division of the travel agency giant Apollo Travel Services, which is owned by United Airlines, USAir and Air Canada and operates one of the world's largest networks connecting airlines, travel agencies and hotels worldwide.

For example, Apollo developed the Airline Link Control Interface with IBM, which allows the IBM 3745 FEP to directly connect airline link control circuits, which are used extensively in airline reservation networks.

Also with IBM, the company developed a Fast Network Reconfiguration package that allows the reconfiguration of failed 3745s to occur in no less than two minutes.

©ACS: (800) 987-3227.



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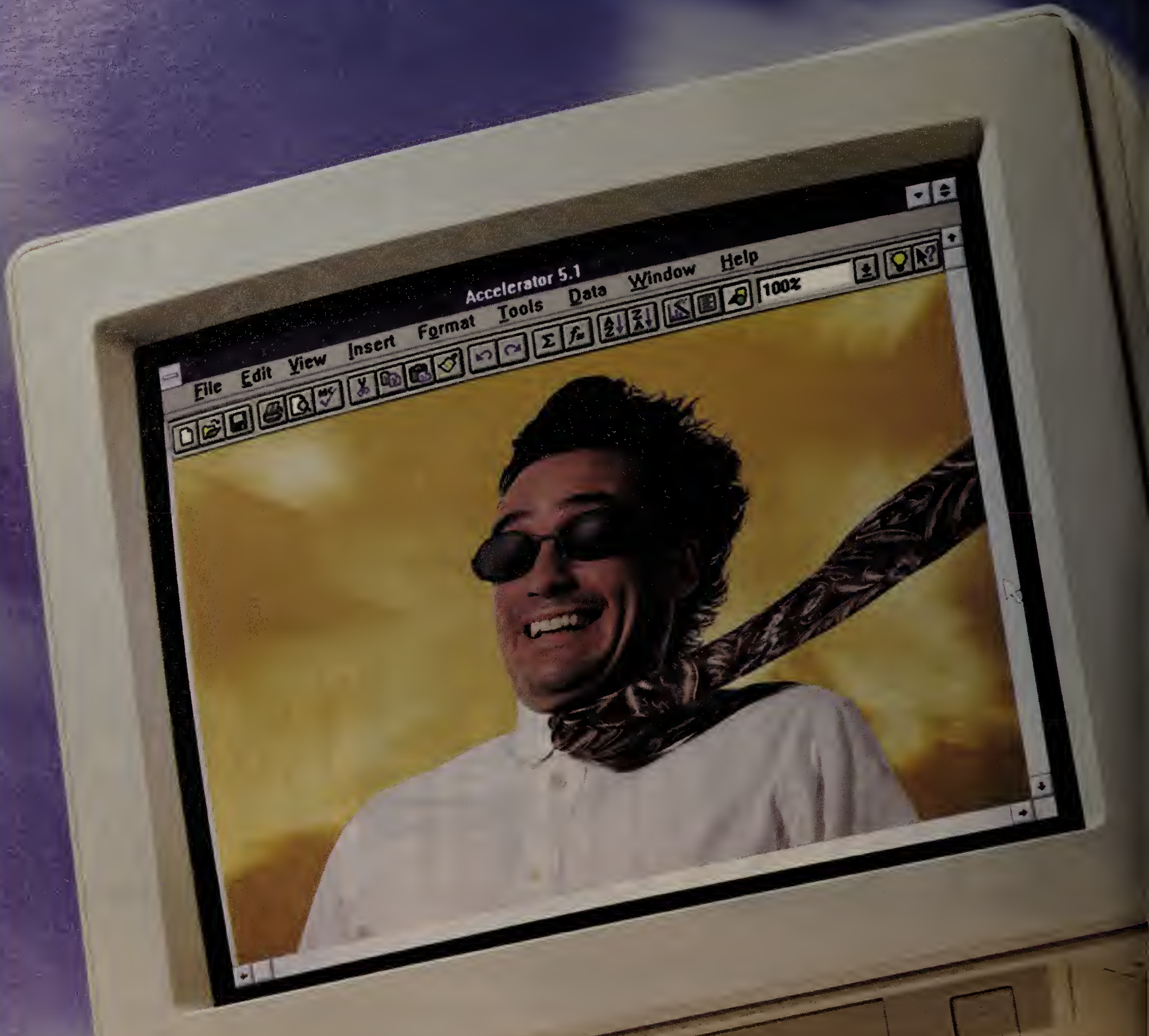
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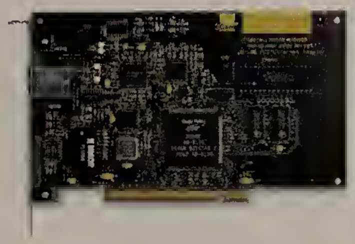

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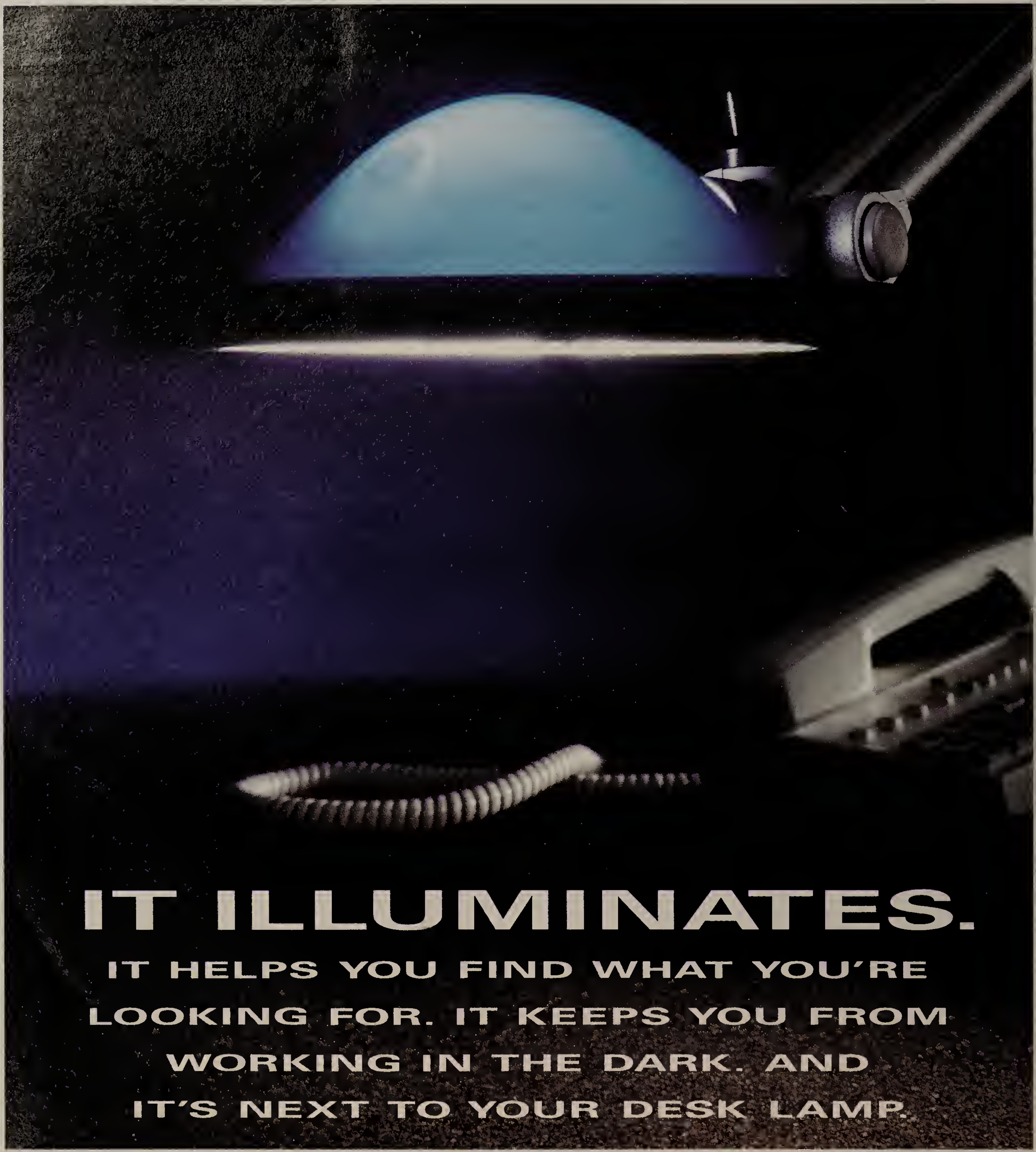
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Bay fills out its BaySIS with Virtual Network Router, ATM switch for 5000

By Jim Duffy

Billerica, Mass.

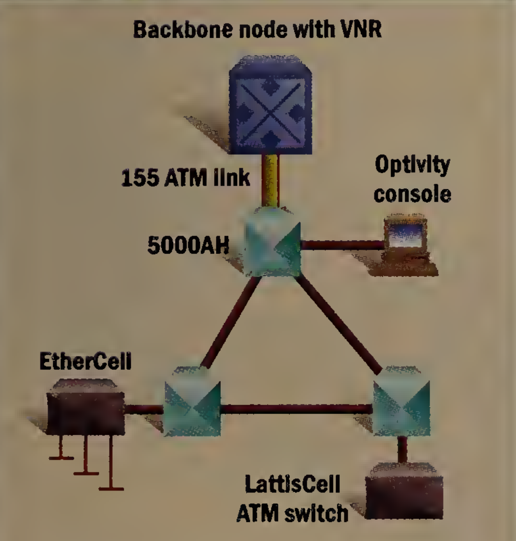
Bay Networks, Inc. has dramatically expanded its switched internet strategy with an Asynchronous Transfer Mode interface for its Backbone Node router and an ATM switch for its Lattis System 5000 hub.

Bay Networks' new ATM Routing Engine (ARE) for the Wellfleet Backbone Node router provides 155M bit/sec full-duplex routing between multiple virtual LANs. In a collapsed virtual internet backbone architecture, ARE connects the Backbone Node to the new ATM switch for the Lattis System 5000 and performs routing for all LAN segments that have downlinks to the 5000.

ARE also takes packets from a remote LAN, converts them to cells and feeds them to the 5000. Conversely, ARE takes cells from the 5000, reassembles them into packets and shuttles them to WAN ports on the Backbone Node for transmission to distant LANs.

ARE also functions as a LAN Emulation client in an ATM net. That means when it takes in LAN packets from distant nets, it requests an ATM address for that packet from the 5000, which functions as a LAN Emulation server. Once the ATM address is obtained, the packet is converted to cells and sent to the appropriate VLAN over the appropriate ATM circuit.

Virtually at Bay



Bay Networks' new virtual network routing (VNR) is designed specifically for the "one-armed router" application of interconnecting several virtual LANs via one ATM link.

GRAPHIC BY SUSAN J. CHAMPENY

Only Ethernet LAN Emulation will be supported in the first release of ARE, according to Bay Networks.

"In a concept sense, it seems to me to be pretty straightforward," said Thomas Nolle, president of CIMI Corp. in Voorhees, N.J. "They're taking the idea of cut-through switching as far as you can take it. And they're separating the function of routing and address management from the function of connection [management]. All ATM networks should set up cut-through connections, where the source of address information is not a party to the conversation once the endstation finds out what it is. Once I know the address of my partner, I don't call the server, I call the partner."

ARE sports two Motorola, Inc. PowerPC processors, and supports both single-mode and multimode fiber Synchronous Optical Network (SONET) interfaces. DS3 (45M bit/sec) and E-3 (34M bit/sec) coaxial interfaces will be available later this year.

ARE costs $25,500 for a multimode version. It will be available in the fourth quarter. Bay Networks plans to add a virtual network routing module to the Lattis System 5000 in the first half of 1996.

Meanwhile, the ATM switch for the 5000, dubbed the Model 5000AH, supports as many as 16 ATM ports with an aggregate switching capacity of 5G bit/sec. It includes an integrated ATM control module for connection management, LAN Emulation server functions and network management.

The Model 5000AH supports both single-mode and multimode SONET fiber interfaces. A multimode version of the switch costs $40,875 and will be available in the fourth quarter.

Bay Networks plans to add an ATM backplane to the 5000, enabling it to integrate Ethernet-to-ATM and token ring-to-ATM switching modules.

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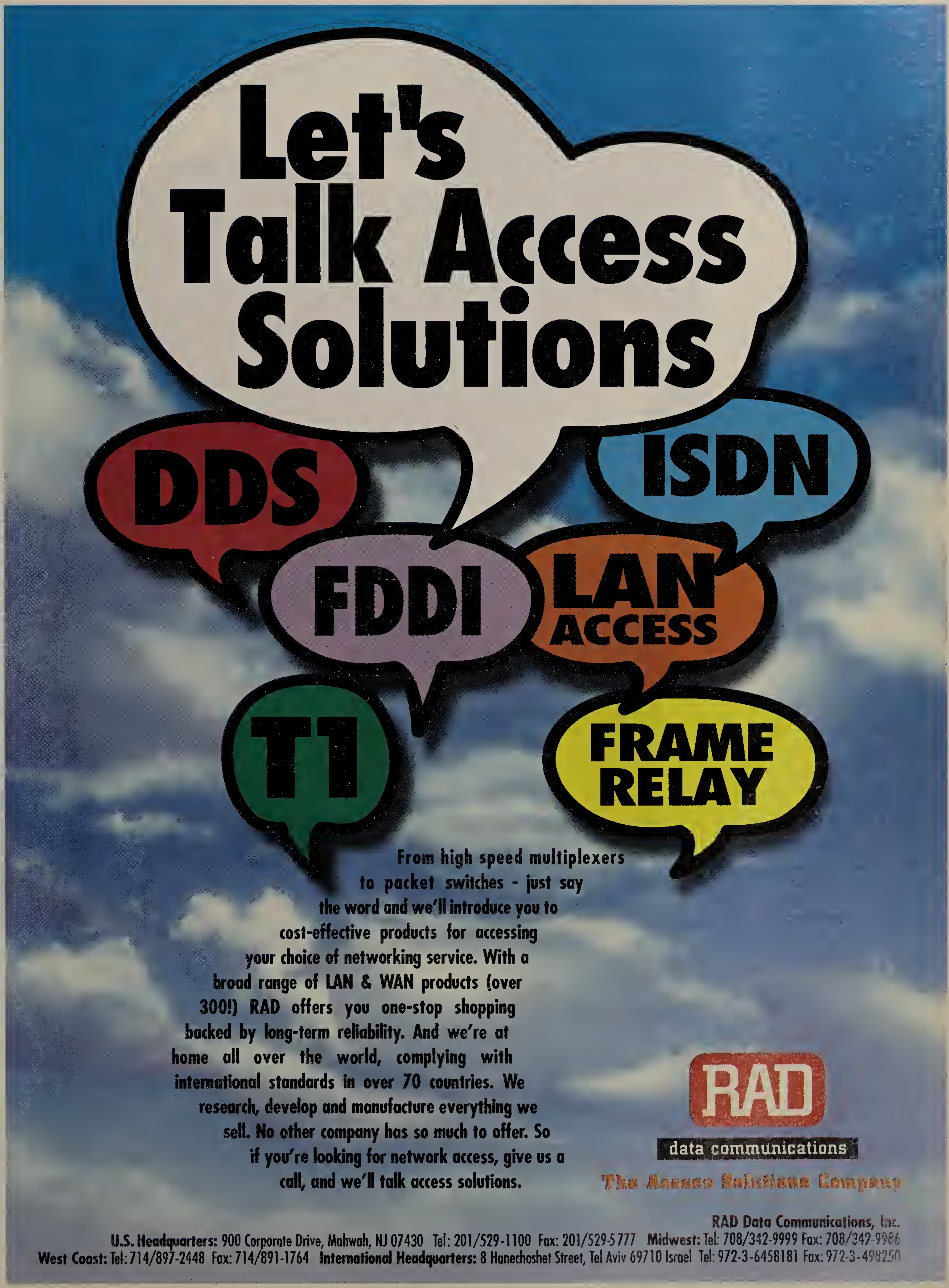

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Follow-me

Continued from page 21

into a set of services that includes call screening, receiving faxes and voice mailboxes.

Some of the more advanced platforms — Wildfire's among them — include many features of personal digital assistants (PDA), such as scheduling and reminder calls managed via voice recognition. "This is like a ghostly PDA," said Tim Schmitt, president of Intelligent Technologies International, Inc., a consulting firm in Orlando.

"We like to call it the personal analog assistant market" because access can be over traditional analog phone lines, said Mark Lowenstein, director of wireless research at The Yankee Group in Boston. He estimates the total market for follow-me services at less than $50 million but expects it to grow along with the boom in mobile users.

The products fall into two categories: those meant to help carriers provide services, and those meant for corporate users with roaming employees.

Two markets

TPS is one company shooting for the carrier market, according to David Turok, chief technical officer for the Islan, N.J., company. Its platform is based on Bell Communications Research technology that was developed for the RBOCs but could not be used by them because of the regulatory environment.

TPS licensed the technology and has turned it into a marketable service it sells to carriers. It also runs a service bureau in New York aimed at users that do not want to buy the platform but want the service.

Priority Call Management straddles both carrier and corporate markets with its Oryx platform, which can scale from a single T-1 interface to as many as 64 T-1s.

The company is also introducing features that allow voice dialing, conference calling and overflow call routing, which will redirect calls within an organization if the primary party is busy.

Wildfire markets to private companies but is working on a carrier version of its platform. The maximum capacity of Wildfire's platform is 72 phone lines, but the company is teaming up with McCaw Cellular Communications, Inc. to develop a platform for wireless providers.

Wildfire announced that Milcom Corp., Advanced Communications Technologies, Inc. and Virtuosity, Inc. will market the Wildfire service on Wildfire hardware in Boston, Chicago and Los Angeles, respectively. ■

SNA/LAN

Continued from page 21

found none to be as cost-effective as APTNet.

"APTNet costs about $1,000 per branch, and the others averaged about $2,000," Wilson said. "Plus, it is rare to find people who are PC literate, let alone anyone who knows about LANs or routers in our branches, so we needed something we could administer centrally."

Since APTNet also includes its own software distribution and file-transfer capabilities, the company did not need to purchase separate packages to perform those duties, Wilson said.

In the past, if the bank needed to make changes in its systems or update files or software, it had to make 43 sets of floppy disks and ship them to all the branches, he said. Then the support staff had to spend hours on the phone going over installation procedures with the branch folks — a time-consuming, expensive process.

With APTNet's integrated software distribution and file transfer capabilities, changes can be sent from the mainframe to the branches at the push of a button, according to Wilson. The bank also uses APTNet to make network configuration changes.

"For example, if a remote teller wants their documents routed to a different printer within the branch, that requires an update to a LAN configuration file," he said. "We use APTNet to take over the PC on that LAN and reconfigure the file for the teller." ■

For more info on this story, point your browser at http://www.nwfusion.com. After you log on, select News and then WANs and Internetworking.

NetworkWorld Fusion

LOCAL COMPETITION

Multirate ISDN user wants some more of a good thing

By Joanie Wexler

New York

An early user of multirate ISDN services is citing big savings in his videoconferencing network, where flexible services are available.

Richard Eastman, vice president of engineering and network design at Virtual Presence International, Inc., said he is saving up to 30% on phone bills over standard ISDN services in the relatively few areas where local multirate ISDN is available. The company is a subsidiary of The World Trade Centers Association charged with implementing a worldwide videoconferencing network among centers.

— the —
ALMIGHTY
DOLLAR

Multirate ISDN is a twist on Primary Rate Interface service. Functions on the carrier's central office switch allow users to make one phone call to gather multiples of 64K bit/sec bandwidth — or DS0s — in the cumulative size needed for a given transmission.

This contrasts with traditional PRI services, which allow users to dial bandwidth as needed but require them to place separate phone calls per DS0 using an inverse multiplexer.

Eastman said the savings he has seen over standard PRI on his year-old network, which is used about 20 hours per week, come partly because the services are priced less than PRI services. But mostly, he said, the savings are due to the efficiencies of making just one telephone call for the needed chunk of bandwidth.

Virtual Presence has determined that dialing 384K bit/sec takes about 1 second, compared with about 30 seconds using an inverse multiplexer. At T-1 speeds, the full bandwidth still takes a second to dial up, compared to a full minute using an inverse mux, he said.

The corker on price is that by employing the inverse mux, the user pays for each call once a connection is made, even though that active channel sits unused while waiting for the other 64K bit/sec circuits dialed after it to connect. Then, "if there is a problem and, say, the 18th DS0 connection dies, the other channel connections ring up charges, even though they haven't been used for anything," Eastman explained.

Thirty World Trade Centers are up on the network, and Virtual Presence intends to bring all 290 worldwide centers online over a three-year period. Eastman said the multirate savings potential grows greater as services are deployed internationally, where per-minute charges are much greater.

So far, though, multirate ISDN is limited overseas to a few European countries, such as Belgium and Switzerland. And even in those countries, users can only dial certain multiples of 64K bit/sec, not all of them, he said.

Virtual Presence's videoconferencing network is designed to serve meeting-minded businesses that are part of The World Trade Centers Association, as well as the public. The net relies on multirate services from LDDS WorldCom, the only major interexchange carrier to offer multirate ISDN until MCI Communications Corp. launched its services last month (*NW*, Sept. 4, page 15).

AT&T offers the option of dialing up 384K or 1.54M bit/sec, but not the granular Nx64K bit/sec increments that LDDS WorldCom and MCI offer.

Virtual Presence also uses local multirate services from Ameritech Corp., NYNEX Corp. and SBC Communications, Inc., the three local carriers that have it available. Thankfully, Eastman said, about a third of Virtual Presence's videoconferences take place among Chicago, New York and St. Louis, which fall in those local carriers' regions.

For videoconferences where local multirate service is unavailable for all conference locations, the firm uses PRI services and inverse muxing equipment from Premisys Communications, Inc., Promptus Communications, Inc. and TyLink Corp. that also support multirate. This lets Eastman use the same equipment to bridge multirate and standard PRI services.

Where no ISDN is available, Virtual Presence uses the Sprint Corp. Meeting Channel or switched 56K bit/sec links. ■

Getting the hang of local phone competition

By Tim Greene

New York

Paul Kirvan has had the liberating experience of having a choice when picking a carrier to provide local telephone service, and he thinks it will save him big money.

As the director of telecommunications for Mt. Sinai Medical Center in New York, Kirvan weighed his options and decided to dump NYNEX Corp. in favor of Teleport Communications Group (TCG), which has co-carrier status in New York.

As telecommunications reform causes regulations that forbid local competition to crumble, more users like Kirvan will have similar options.

Months ago, TCG came courting and offered Kirvan a package for local switched direct outward dial phone service that was $250,000 to $300,000 less costly per year than what Mt. Sinai was paying NYNEX. He told NYNEX about the offer, and the regional Bell holding company came back with a counterproposal.

"They claimed they could meet and possibly exceed any savings Teleport could do, but for the life of me, I couldn't understand how they would do it," Kirvan said.

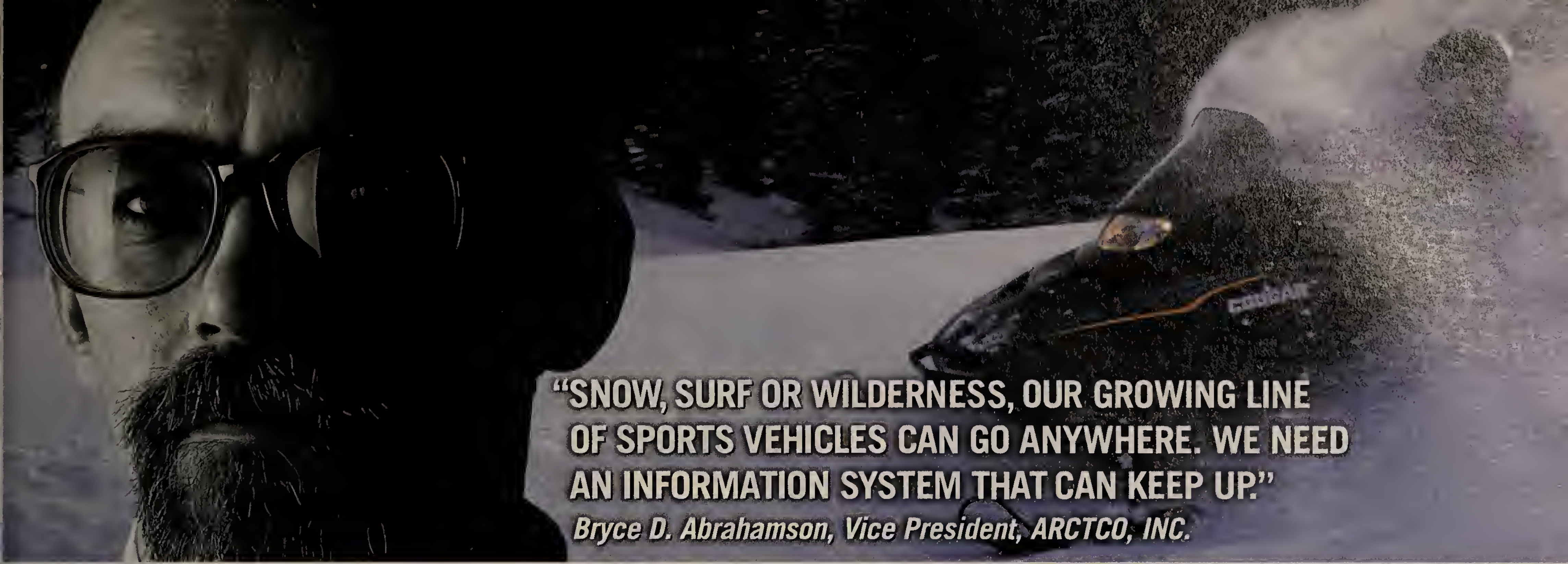
He also did not like NYNEX's attitude. "The approach was, no matter what happens, Mt. Sinai will continue to be a NYNEX customer," Kirvan said.

He said he talked to other New York hospitals that had switched to TCG and they maintained that the projected savings were real. "That made the decision a lot easier for me," Kirvan added.

He signed the TCG deal about two months ago, and the cutover from NYNEX was completed a few weeks ago. "We're awaiting the first full bill from Teleport to see how good they are and how close they were with their projections in terms of savings," Kirvan said.

Kirvan set up the telephone equipment area at Mt. Sinai so that if TCG's performance falls off, he can remove their equipment easily and install someone else's. He would encourage other users to do the same so they can make an easy transition from one carrier to another.

"I put Teleport on notice that they're in now, but if they don't do the job, then they're out — and I'll bring somebody else in or I'll bring NYNEX back in," he said. "It's not something I was able to do 18 years ago when I first became a communications manager. Back in 1977, we didn't have any options for local service." ■



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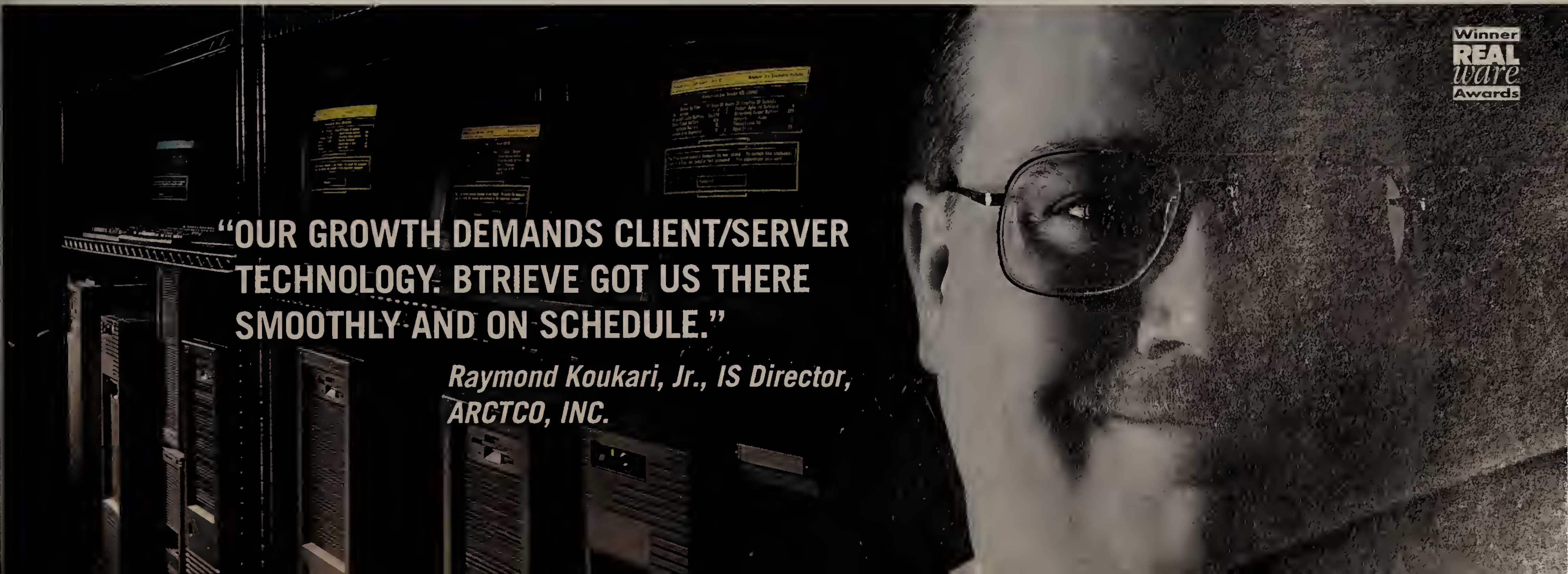

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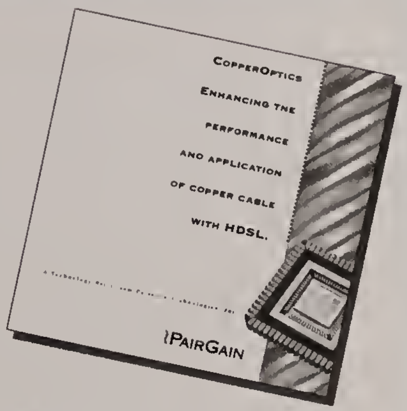
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WAN MONITOR

Digital 800 gains momentum

Digital 800 is gathering steam, quietly. AT&T and MCI launched their products in January, and Sprint is expected to in the next few days (*NW*, March 6, page 41).

Are many people actually using this stuff? You betcha, and interestingly, some applications are demanding it. Today's service users are looking for strategic solutions to cure a lot of application headaches. The early no-brainers have included remote LAN access, high-bandwidth file-transfer applications and any application requiring carrier-independent routing.

Here's six reasons why these applications are hot:

- **Ease of use.** Everyone knows how to dial an 800 number, and voice and data can ride over the same 800 line.
- **Reverse billing.** Here you get around the issue of end users submitting bills from home since 800 is billed on the terminating account.
- **800 numbers transcend presubscription.** You don't need to worry about what carrier remote workers use at home since digital toll-free routes and terminates over your carrier of choice.
- **800 allows applications billing.** You can finally get out of parsing telecommunications expenses by applications. You can track specific tasks, — such as sales-order entry — by which 800 number was used, and then reverse-bill it to that cost center. This is far easier than project-code billing.
- **Bandwidth.** A lot of applications, such as radio programs and distributed printing, require lots of sheer bandwidth for some period of time. In response, some Internet providers are using Digital 800 for toll-free access. While the most common access link will be BRI, if you need more than 128K bit/sec, you can inverse mux more channels or use multirate ISDN.
- **Marketing.** Firms can apply the value associated with 800 services to both new and existing applications. Using 800 —, which is renowned as a powerful coustomer service vehicle — for data applications is a win-win situation.

Daniel Briere and Christine Heckart

But not all Digital 800 is the same. AT&T's service can route calls differently according to whether the call is voice or data, and its network management shows voice vs. data call information. AT&T also just got rid of a big limiter in its product — charging the same rate for voice and data — which artificially raised the cost of voice applications. Like everyone else, AT&T now offers users the standard toll-free voice rates, with a slightly higher data rate.

MCI is the only carrier that does offer multirate ISDN, and it charges different rates based on speed. The company also has service to Canada, which is available on products other than its 800 services. (AT&T has no Canadian access and is still only available to Megacom users.)

The other big carrier, Sprint, says its product will be available in 22 countries right away, and it expects to have a range of new billing capability for Digital 800 in the first quarter of 1996.

What's missing with Digital 800 today is the big link to electronic commerce, which requires a new end-user interface to make dialing easy. Soon, though, you'll see software being given away by the carriers to promote a consistent electronic commerce interface, whether for the Internet, dial-up Digital 800 or some other service. That's crucial to making Digital 800 as easy to use as analog 800.

Don't be confused by changes in the product names. The politically correct way of saying this is now "Digital Toll-Free," given the upcoming 888 codes.

Get ready. By all indicators, Digital 800 will hit mainstream within another 18 to 24 months. Don't get left in the cold.

Briere is president and Heckart is director of broadband at TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny—briere@telechoice.com or christine—heckart@telechoice.com. They will share this space with Scott Bradner, whose column will appear next week.

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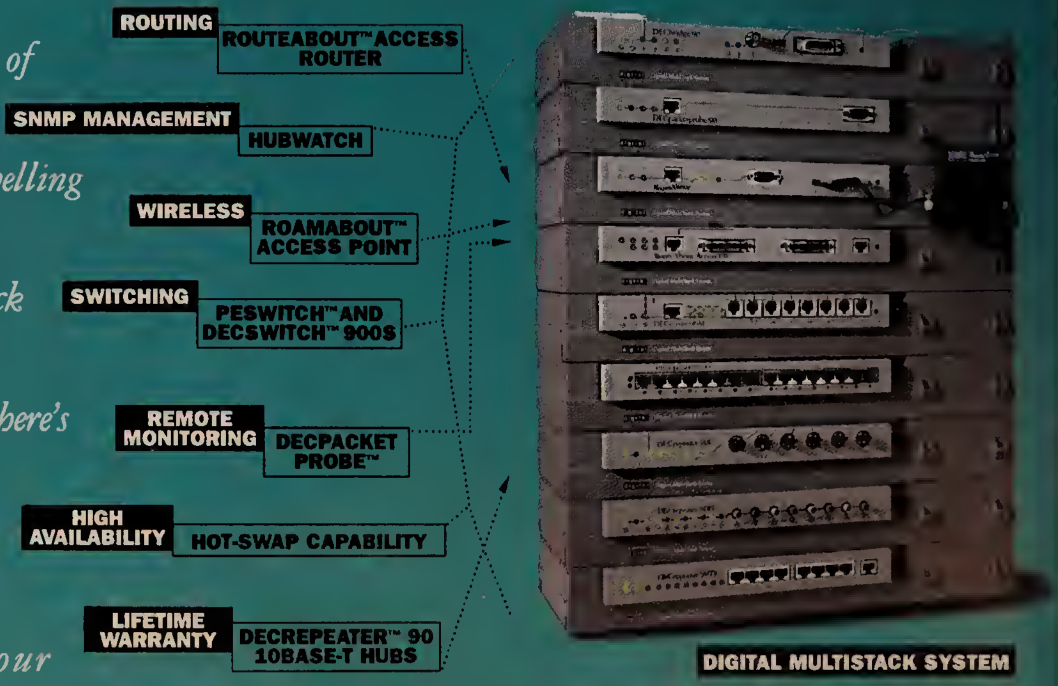

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Circle Reader Service #98

New area codes vex foreign callers

But workarounds exist for domestic and international communications.

By David Rohde
Washington, D.C.

It's a bad enough feeling missing voice and data connections from across the country because some callers can't recognize an area code in the unusual new format — one with a digit other than a 0 or 1 in the middle.

Now imagine that the attempted call is from halfway around the world, and callers believe they have nowhere to turn.

It's happening. Users in new area code regions such as southern Alabama, southern Arizona and western Washington state have reported particular problems receiving calls from overseas locations. Such problems could spread across the country as new-style area codes reach out to other regions.

But there are ways to work around the problem. Users can, for instance, extend their 800 numbers to temporarily substitute for the new number (*NW*, Sept. 18, page 24).

An alternative solution

For critical communications, users can consider an alternative such as AT&T's USADirect 800 program. With USADirect 800, callers in 134 countries can call U.S. companies directly and have the charges reversed. And unlike AT&T's older International 800 service, USADirect 800 allows companies to promote the same 800 numbers domestically and overseas.

USADirect is relatively expensive, so it should not be viewed as a routine or permanent alternative.

On the other hand, using such a service may actually provide some cost savings if the overseas callers are from your own organization, pointed out Len Elfenbein, president of Lynx Technologies, Inc., an international telecommunications consultancy based in Fairfield, N.J.

This way, you can avoid typically high international direct-dial rates from foreign countries, he said.

One unique problem to anticipate in foreign connections, Elfenbein said, is that an individual overseas location may not be able to reach your domestic location at all times. That is because foreign carriers hand off calls to U.S. domestic carriers in proportion to the amount of business they receive from them. Even if all principal U.S. interexchange carriers are set up to recognize new area codes — and they all say they are — they may choose different paths to deliver the call.

"It could be an intermittent problem," according to Elfenbein. ■

Discounts

Continued from page 21

Block & Boothby.

Under a plan dubbed Fast Start — not to be confused with the carrier's FASTAR (for Fast Automatic Restoration) system for network outages — the carrier wants to add an international-discount clause to the general terms and conditions of Tariff 12. The clause would then be incorporated by reference in a nontariffed contract between AT&T and the user.

"I don't think the FCC is going to allow a rate in the tariff that governs [connections between] Frankfurt and Singapore. I think the Germans and Singaporeans would have something to say about that," Levine said.

But the Fast Start plan would allow Tariff 12 users to obtain a discount wherever foreign authorities do not specifically object, he said.

"They're socializing it with a lot of the people who have big Tariff 12s," according to Levine.

Eventually, it is believed that AT&T would like to extend the same cost benefit to the growing legions of AT&T users who obtain discounts off so-called contract tariffs (see graphic).

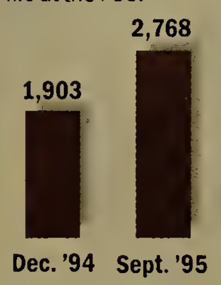
But Levine cautioned users signing contracts for Uniworld, Concert or other global services to include clauses that allow them to opt out of individual country-to-country connections that turn out to not be discounted.

Scott Blake Harris, chief of the FCC's International Bureau, indicated the commission is studying the issue closely.

"We need to take down obstacles," Harris told the users, who were attending Swiss Telecom PTT's annual U.S. users meeting. But he added, "I'm talking on principle, and I ought not rule on what is being discussed at the FCC." ■

POPULAR WAY OF DOING BUSINESS

AT&T contract tariffs on file at the FCC:



Each contract tariff typically describes a specific deal with an individual user for one or multiple AT&T services with negotiated term plans and discounts.

SOURCE: FCC, WASHINGTON, D.C.

BusinessBriefs

IBM stock recently took a hit when the company reported that shipments of its less expensive, highly touted **CMOS-based mainframes** would be delayed until sometime in the fourth quarter. About 300 customers had expected delivery of the Big Iron in the third quarter.

IBM blamed the delay on an unnamed third-party power supply dealer and unexpectedly high demand for the new machines delay could drop IBM's third-quarter earnings by about $250 million.

Computer Associates International, Inc. last week said it will market Cheyenne Software, Inc.'s storage management products to **CA-Unicenter** users.

The software is based on Cheyenne's image-based backup and Redundant Array of Inexpensive Disks (RAID) 5 fault-tolerance technology. It uses data backup software that writes information to multiple tape drives simultaneously using RAID formats.

Sprint Corp., along with its three cable television partners in a local and **wireless telephone** venture, announced that eight additional cable companies have agreed to affiliate.

The move extends the venture's cable reach by 8.8 million homes. Though not owners of the venture, the affiliates are expected to upgrade their facilities to telephony specs in exchange for a percentage of anticipated local telephone revenue.

MCI Corp. has chosen U.S. Robotics, Inc.'s Total Control Enterprise Network Hub for access to **networkMCI Business,** MCI's Internet access package. Terms of the agreement were not disclosed.

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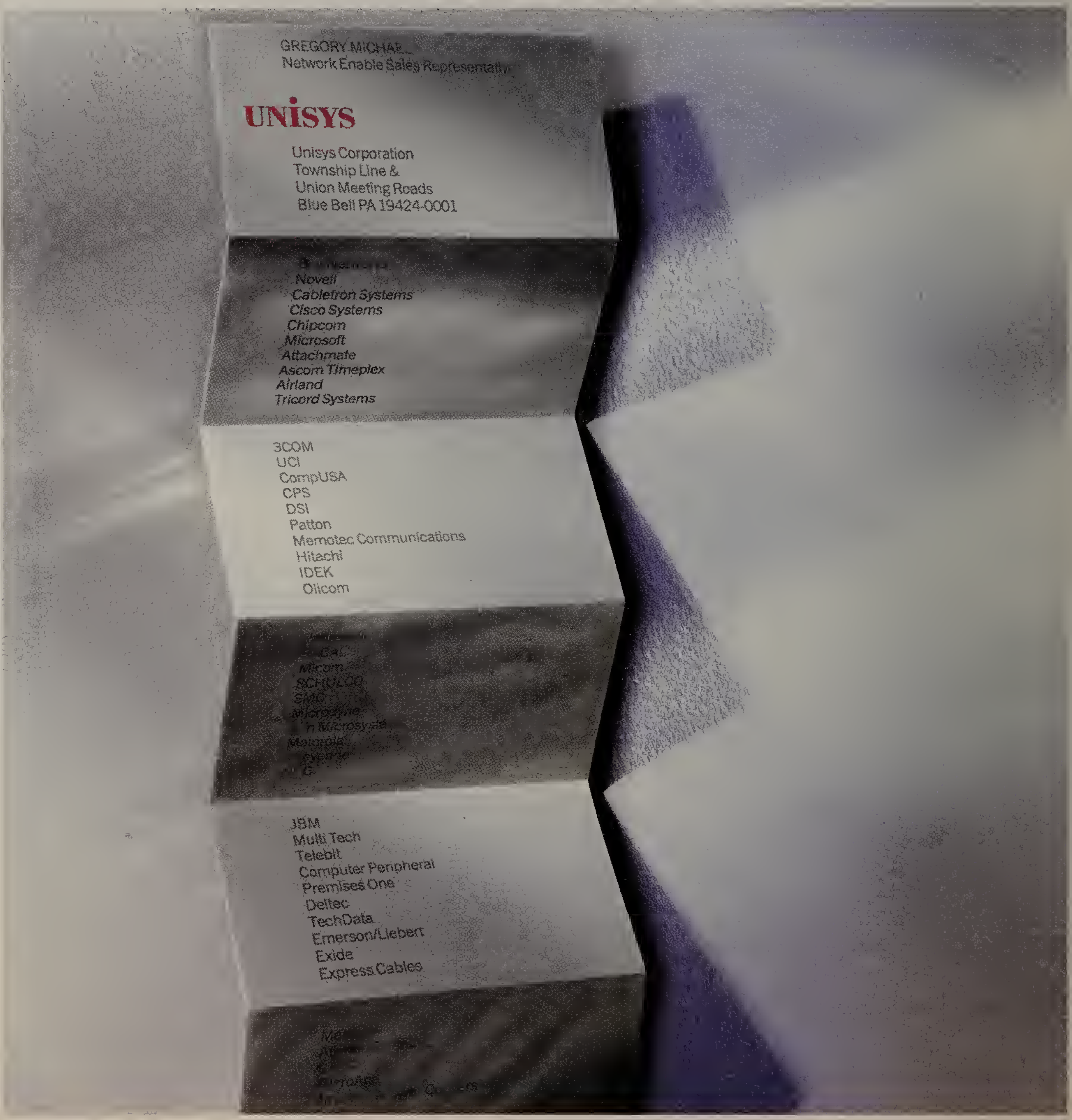

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Net2Net targets ATM analysis

By Jim Duffy

Hudson, Mass.

Net2Net Corp. claims to have a silver bullet capable of killing off resistance to ATM.

The company entered the network management market with Cell Blaster, an analyzer that monitors, captures and filters Asynchronous Transfer Mode traffic and performs ATM-layer cell decodes.

Net2Net claims Cell Blaster will help accelerate the deployment of ATM technology by making ATM network behavior more understandable and predictable, and doing so with products that are attractively priced.

Competitive products, such as those from Hewlett-Packard Co. and Network General Corp., cost three times as much or have baggage from a legacy of shared-media LAN analysis to contend with, argued Rick Arena, vice president of marketing and field operations for Net2Net.

Analysts agree.

"We think it's really important that people are thinking about ATM collection and packet decodes because other analyzers on the market today for other technologies catch different packets here and there," said Christine Curtis, a consultant at Northeast Consulting Resources, Inc. in Boston. "When you're catching cells, you need to catch them all because to find out what's wrong with a cell, you need all of the pieces."

Cell Blaster includes modular cards for a Pentium-based PC called Cell Engines. These engines are outfitted with an Intel Corp. i960 Reduced Instruction Set Computing processor and 96M bytes of dynamic RAM, and software that runs under Windows and Windows NT. It also includes physical interface boards for OC-3 and DS3/E-3 links that snap onto the Cell Engines.

Each port is equipped with its own filter and capture logic. Cell Blaster can simultaneously monitor as many as 32 ATM trunks.

Cell Blaster gets an ATM physical connection and regenerates the output while grabbing Synchronous Optical Network (SONET) frames and cells off the line.

With captured frames and cells, users can decode data from the physical level up past the ATM Adaptation Layer from the Cell Blaster graphical user interface. LAN and WAN protocols can be decoded, as well.

The Cell Blaster software supports Microsoft Corp.'s OLE 2.0 technology, which allows users to integrate and display management and analysis data alongside their other Windows or Windows NT applications, such as Microsoft Excel. This helps users do meaningful reporting, Net2Net said.

Also, users can develop diagnostic routine scripts in Visual Basic, C or C++ programming languages that can be launched via OLE.

An entry-level Cell Blaster, including one ATM port, is priced at $39,995. Additional ATM ports are available for $22,000 each. The system is available now and will be demonstrated at this week's NetWorld+Interop show in Atlanta.

©Net2Net: (508) 568-0600.

Network design vendors roll out new offerings

By Jim Duffy

Two makers of network design tools are prepping new and enhanced wares to accommodate growing networks and evolving business demands.

Optimal Networks brought out software that enhances the network modeling and simulation capabilities of its flagship Optimal Performance product. And NetSuite Development unveiled a tool that validates the design of a network infrastructure before it's implemented.

"Our network is growing tremendously and was getting complex, too, because we have sites all over the country," said Eligio Rollo, systems and network manager at Community Care Networks in San Diego.

"We needed something that would help us take network data and be able to do capacity planning, what-if scenarios and reconfigurations," he added.

Optimal offerings

Optimal Surveyor

- Multiprotocol topology discovery and analysis tool for representing logical connectivity of network

Optimal Performance 2.0

- Builds a model of the topology and traffic using a SQL database
- Provides view of network by application, protocol or topology

Optimal's products are Windows-based applications for previewing changes to a net's topology. They include a new software package, called Optimal Surveyor, and an upgrade to the company's Optimal Performance package.

Optimal Surveyor is a topology discovery and analysis tool that creates models of the logical interconnectivity of a network. It uses the Simple Network Management Protocol to glean IP, IPX and VINES topology data from network routers, and connectivity data from bridges and switches, and it stores all this information in a SQL database.

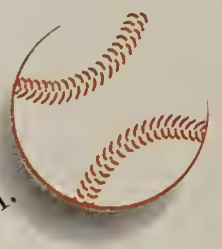
Version 2.0 of Optimal Performance, meanwhile, imports traffic information collected by network monitors to create a model of network traffic. Users can create multidimensional views of network traffic that can be used to analyze overall network traffic flow. Also, a browser feature enables users to view traffic by application or protocol, or specific conversations crossing any bridge, router, switch, LAN segment or WAN link.

Optimal Surveyor will be available in October for $5,000. Optimal Performance 2.0 costs $25,000 and will ship in the fourth quarter.

NetSuite, meanwhile, unveiled NetSuite:Professional Design, software for small sites that uses information on some 2,500 devices from 50 vendors. NetSuite:Professional Design runs on 486-based PCs under Windows, Windows 95 and Windows NT. It allows users to design physical and logical representations of local-, wide- and metropolitan-area networks, validate it using a rules engine and prepare work orders to implement the design.

NetSuite:Professional Design costs $995 and will be available in October. An introductory price of $495 is valid through the end of the year. NetSuite:Professional Design uses a library of device information, called NetSuite:Library, that costs an additional $295 per year. It will also be available in October.

©Optimal: (415) 254-5950; NetSuite: (508) 647-3110.



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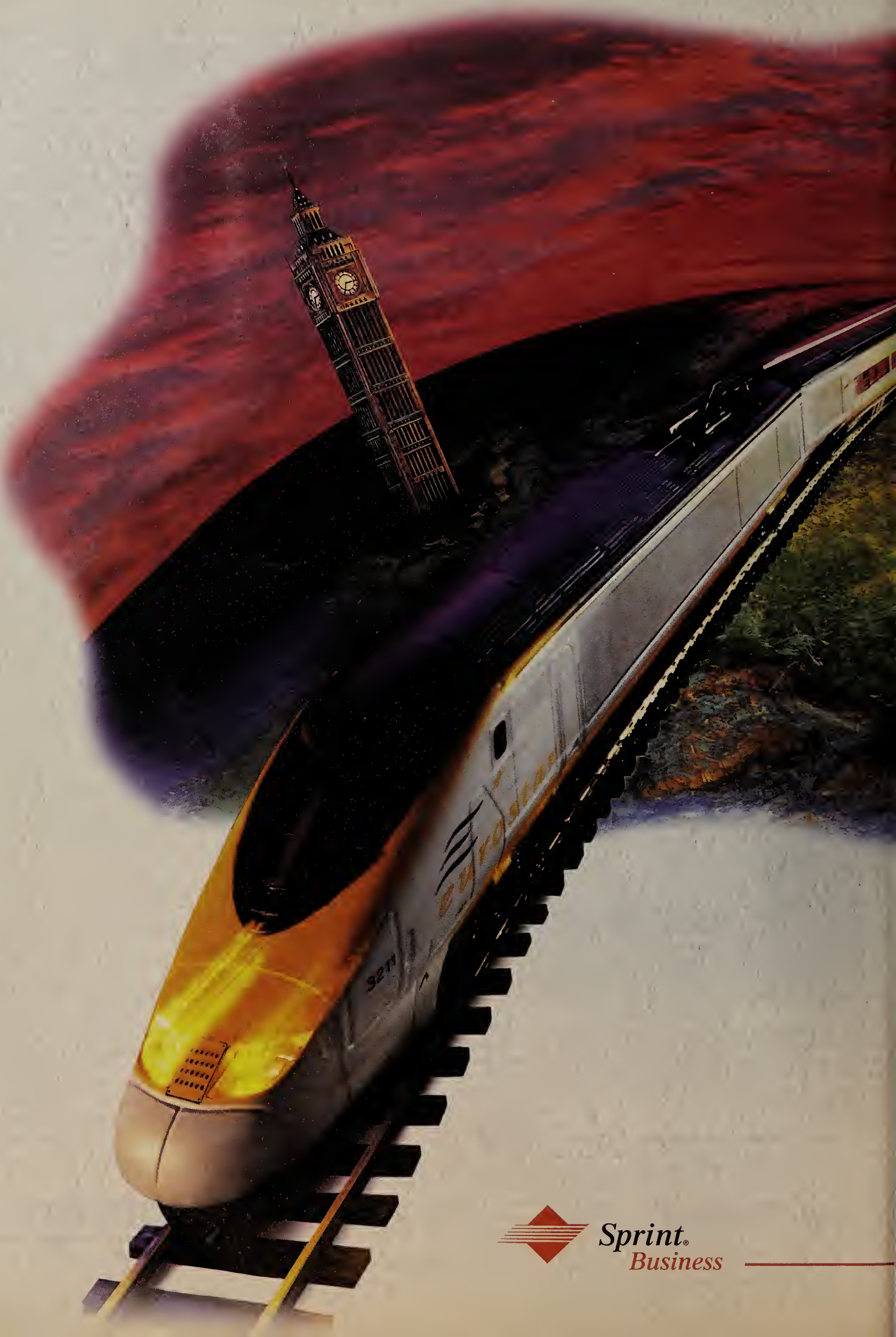
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Circle Reader Service #**62**

LAN World

A Special Monthly Section for LAN Decision Makers

INSIDE LAN WORLD

Obstacles are still blocking ATM's move to the desktop.
Page 6L

Preferred Systems tool makes NDS management bearable.
Page 6L

Three companies unveil products for LAN-attached CD-ROM drives.
Page 13L

LeBaron and MacAskill reach out with advice on remote LAN access.
Page 15L

Briefs

■ **LANovation, Inc.** *will announce at NetWorld+Interop this week a new version of its LAN Escort* **software distribution** *product that supports Novell, Inc.'s NetWare Directory Services (NDS).*

LAN Escort 3.5 includes a graphical user interface to the directory to allow network managers to select users or groups that should receive software.

The product distributes the software, updates Windows files on the client, adds an icon to the desktop, creates directories and updates user rights in NDS.

The software will be available by year-end priced starting at $995.

LANovation: (612) 379-3805.

■ **Digital Equipment Corp.** *last week unveiled a* **one- or two- processor** *server aimed at large workgroups or departments. The 133-MHz Pentium-based Prioris HX5133 includes a 512K-byte write-back cache, a PCI bus, and PCI Fast-Wide SCSI-2 controllers and devices.*

Pricing for the single-processor version starts at $6,999 and at $12,999 for the dual-processor version.

Digital: (800) 722-9332.

Preventative measures can help ward off viruses

Antivirus programs and well-enforced corporate policies are necessary for combating attacks on your network.

By Paula Jacobs

Computer viruses are a growing threat to corporate networks, given increased user connectivity to the outside world via the Internet and on-line services, and accessibility to a variety of software.

Industry experts estimate that there are more than 6,000 existing viruses, so there is genuine cause for concern.

"The network is the carrier," explained James Greene, an analyst with Summit Strategies, Inc., a Boston-based research firm.

Computer viruses cost businesses an estimated $1 billion annually, according to the National Computer Security Association (NCSA).

Viruses are being written at the rate of three to five per day, are found on all continents and have affected millions of computer users.

Despite these seemingly alarming figures, LAN managers need not panic. Many types of products and services are available to help prevent or stop the spread of viruses across nets. And users and experts agree that the problem is manageable.

"Viruses have always been overblown," said Bob Melford, an independent IT consultant based in Mission Viejo, Calif. "The cost of the loss, compared with malicious activities of a company's own employees, is laughable. [The spread of a virus] is now less of a problem than in the past and is preventable with behavioral changes."

Diagnosing a virus

A virus is a computer program that comes to life when an infected program is executed. Viruses spread quickly through cloning and replication. A virus clones itself and then it and its descendants infect other programs when they replicate.

Viruses range from those that are simple annoyances to ones that are maliciously destructive. Some cause damage the instant they enter a system, while others lie dormant until they are activated by the launching of a program or a certain date, time or set of keystrokes.

A computer virus is highly contagious. Once an infected diskette enters a PC or workstation, the virus can easily spread to the PC hard drive, a network server or other diskettes. Viruses that move across the network and infect the server can be quite pernicious because they can then attack all the files hanging off the server.

"Five years ago, there was a misconception about how viruses were transmitted," said Peter Tippett, NCSA president. "Most people thought it was impossible to get infected from data diskettes, but that is the most common method of transmission. Pirated software and computer bulletin boards are actually the least likely causes."

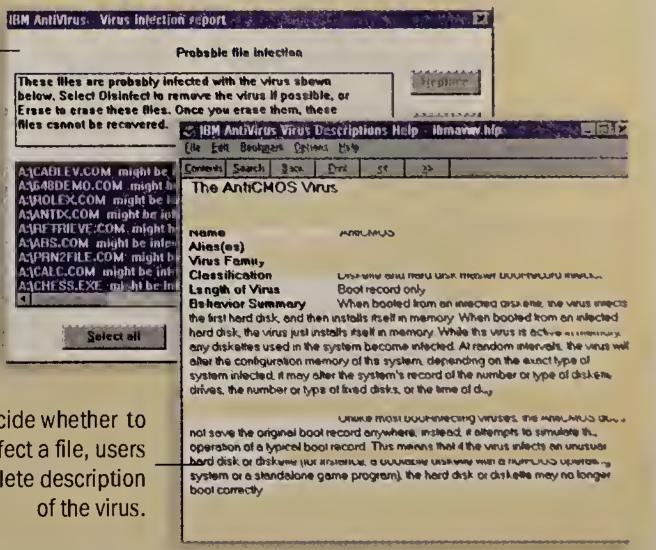
See **Viruses,** *page 8L*

TRACKING A VIRUS

IBM's AntiVirus program helps detect and remove viruses.

Network managers can get a list of all files that might be infected with a virus. They can either erase the file or try to remove the virus.

To help them decide whether to erase or disinfect a file, users can get a complete description of the virus.


IBM AntiVirus - Virus infection report
Probable file infection
Select all
IBM AntiVirus Virus Descriptions Help - ibmaviw.hlp
File Edit Bookmark Options Help
Contents Search Back Print << >>

These files are probably infected with the virus shown below. Select Disinfect to remove the virus if possible, or Erase to erase these files. Once you erase them, these files cannot be recovered.

A:\CABLEV.COM might be
A:\648DEMO.COM might b
A:\ROLEX.COM might be
A:\ANTIX.COM might be in
A:\RETRIEVE.COM might b
A:\ABS.COM might be infe
A:\PRN2FILE.COM might b
A:\CALC.COM might be in
A:\CHESS.EXE might be in

The AntiCMOS Virus

Name [illegible]
Alias(es)
Virus Family
Classification [illegible]
Length of Virus Boot record only
Behavior Summary When booted from an infected diskette, the virus infects the first hard disk, and then installs itself in memory. When booted from an infected hard disk, the virus just installs itself in memory. While the virus is active [illegible], any diskettes used in the system become infected. At random intervals, the virus will alter the configuration memory of the system, depending on the exact type of system infected. it may alter the system's record of the number or type of diskette drives, the number or type of fixed disks, or the time of d

[illegible] not save the original boot record anywhere. instead, it attempts to simulate th operation of a typical boot record. This means that if the virus infects an unusual hard disk or diskette [illegible] system or a standalone game program), the hard disk or diskette may no longer boot correctly

Fore grabs for a piece of the Ethernet pie

By Michael Csenger
Warrendale, Pa.

Looking to lure Ethernet users into its ATM fold, Fore Systems, Inc. has released an Ethernet workgroup switch that ultimately will act as a feeder into Asynchronous Transfer Mode backbones.

The ES-3810 is the first product to emerge as a result of Fore's acquisition of Applied Network Technology, Inc. earlier this year. The switch has been integrated with Fore's ForeView net management system, with further work under way to provide an uplink to Fore's ATM LAN switches, according to Abbot Gilman, Fore's Ethernet Switching Group director of marketing.

As a pure Ethernet switch, the ES-3810 can scale from 16 to 72 10M bit/sec 10Base-T Ethernet ports. A two-port 100M bit/sec 100Base-TX trunk module can be added for connections to another switch or to a high-speed server.

Optimized for high-density workgroup applications, the switch is aggressively priced as low as $183 per port and includes fully integrated Remote Monitoring (RMON) and Simple Network Management Protocol management on each port.

"The critical element here is that we embed per-port management and monitoring capabilities directly in silicon," Gilman said. "So not only do you get Ethernet switching at well under $200 per port, but you're getting

See **Fore,** *page 2L*

Ethernet switch lineup

Product	Port	Management	Price
ES-3810/16 switch (Base model)	16 10Base-T ports	*Out-of-band management	$3,695
ES-3810/24M switch	24 10Base-T ports	SNMP/RMON management	$5,995
ESM-24 module	24 10Base-T ports	Not applicable	$3,995
FEM-2/TX module	2 100Base-T ports	Not applicable	$1,095

*An add-on SNMP/RMON management module is available for the ES-3810/16 for $1,795.

New Fluke line of tools goes looking for network trouble

By Peggy Watt
Everett, Wash.

Fluke Corp. next month will release a new series of handheld LAN troubleshooting tools designed to monitor network traffic and identify problems with network hardware ranging from local hubs to remote access devices.

Unlike a previous LAN-only troubleshooter from Fluke, the 68X Enterprise LANMeter supports the Simple Network Management Protocol, which enables it to read Management Information Bases and access Remote Monitoring agents.

The new device is designed to be more than a cable tester but less than a full-blown protocol analyzer.

"It won't replace the [Network General Corp.] Sniffer in every case," said Neal Allen, a marketing specialist for Fluke's LAN products business unit. "But it allows you to identify and solve most hardware problems. This is designed to help technicians solve most of the day-to-day hardware problems they deal with."

The unit provides a menu-driven interface on a 10-line LCD screen, alarm lights that reflect most common network

See **Fluke,** *page 2L*

Fore

Continued from page 1L

onboard RMON capabilities that would otherwise cost you several thousands of dollars for an external monitoring device."

Analysts said Fore's RMON integration is a handy feature but that the most significant aspect of this announcement is Fore's pricing.

"That they can get down to around $180 per port shows that they understand the need for low-cost access products that will gain them a presence in markets where they may later on sell more of their high-end ATM gear," according to Kathryn Korostoff, president of Sage Research, Inc., a consultancy located in Natick, Mass.

"People are aware that RMON is important, but we find time and again that most customers aren't willing to pay a whole lot for it," she said. "Fore is very smart not to try charging a premium for [RMON]."

Limited flexibility

Fore's new offering is competing head-on with 3Com Corp.'s LinkSwitch products, which cost about $200 per port in similar configurations, Korostoff said. Fore's offering is priced a bit lower but cannot be deployed as flexibly because of address limitations.

The ES-3810 supports only four media access control (MAC) addresses per port, meaning each port essentially supports one desktop with a few attached Ethernet devices. Other Ethernet switch vendors, including 3Com, can support many more MAC addresses per port, according to Korostoff.

"Fore will appeal to users with very specific workgroup needs," she said. "But people who need a more flexible product that can switch between LAN segments will have to look elsewhere."

The switch is available now in several configurations (see graphic, page 1L). It is built around a chassis with four slots for different interface modules.

The base unit for low-end installations is the ES-3810/16, with a 16-port module and optional management capabilities. The ES-3810/24M is a 24-port version with onboard management capabilities.

Fore's $183 per-port bottom line is for a 64-port version of its switch without a fast Ethernet link and lacking onboard management.

©Fore: (412) 772-6600.

Fluke

Continued from page 1L

problems and a keypad on which the user can type a request for a network status update. It also contains an extensive help file.

The 68X Enterprise LANMeter can check network segments for information such as a list of SNMP agents on net devices, verify a host's IP configuration and conduct trace routes to diagnose performance or connectivity problems.

Mainly a diagnostic tool, the offering stops short of acting on most problems. However, it can send scripts across a network and perform a few other basic tasks.

"The LANMeter replaced our protocol analyzer as a first line of attack when somebody reported a network problem," said Scott Baily, a network analyst with Colorado State University in Fort Collins. "It's a lot simpler to use, and a large percentage of the time it provides the information we're most interested in seeing."

The support for remote networks is especially helpful for a sprawling campus with different workgroup LANs attached to a backbone, he said.

Testing by The Tolly Group in Manasquan, N.J., found the device to be stable and reliable, said John Curtis, senior engineer and analyst at the consulting firm.

"It helped me troubleshoot our net, accross FDDI, wide-area and Ethernet. It went out across the remote nodes and identified my bandwidth [utilization] on a router two hops away," Curtis said.

The product limits the time net managers need to spend monitoring remote nets on-site, he said.

"I see it as a whole new world of network troubleshooting tools," according to Curtis.

The 68X Enterprise LANMeter series adds support for NETBIOS traffic. Like the earlier 67X system, the new device also tracks TCP/IP and Banyan Systems, Inc. VINES nets.

The 68X Enterprise LANMeter models include the 680, which supports token ring, and the 682, which handles Ethernet. Each is priced at $8,495.

Model 685 supports both LAN types and costs $11,495.

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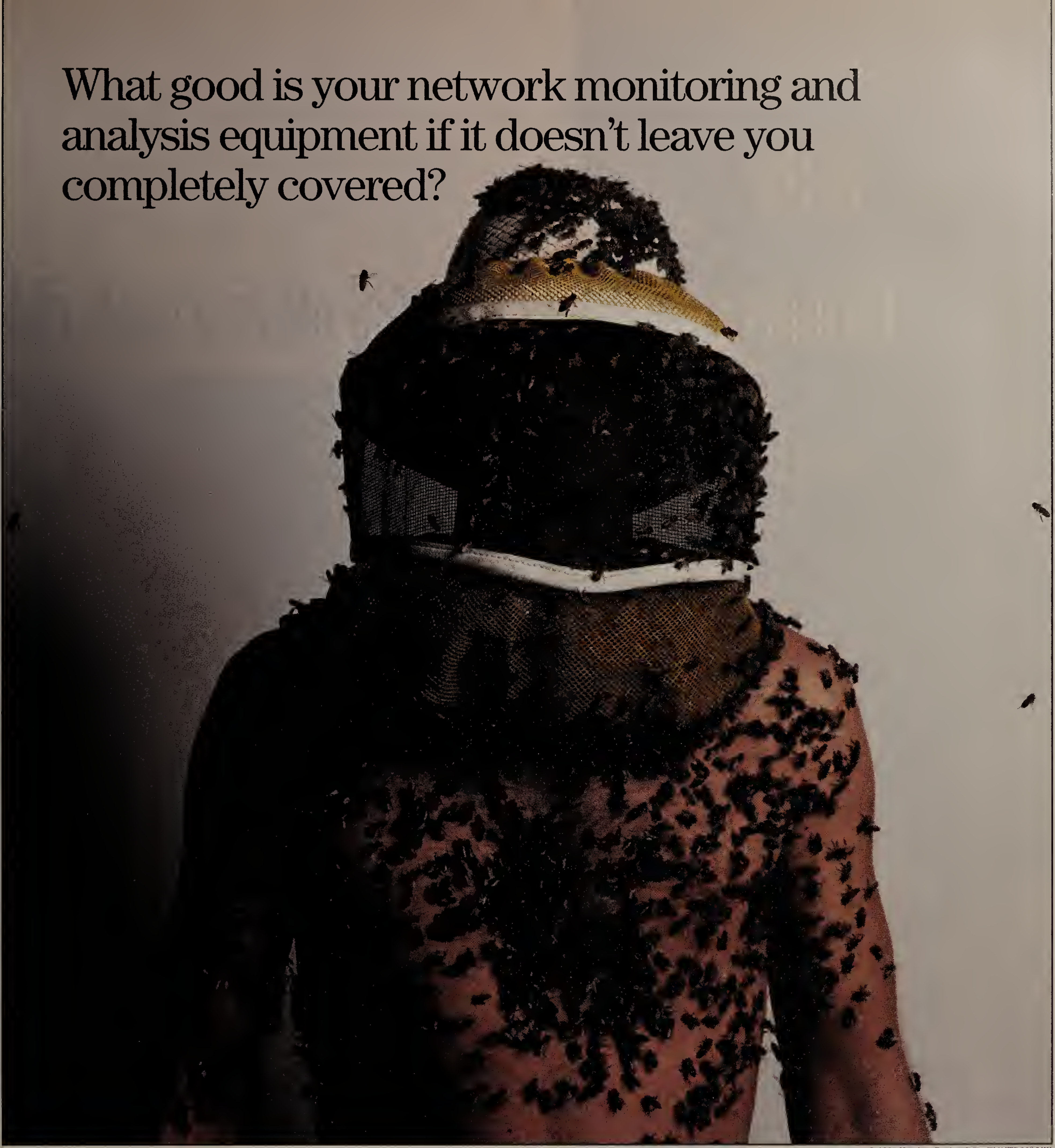

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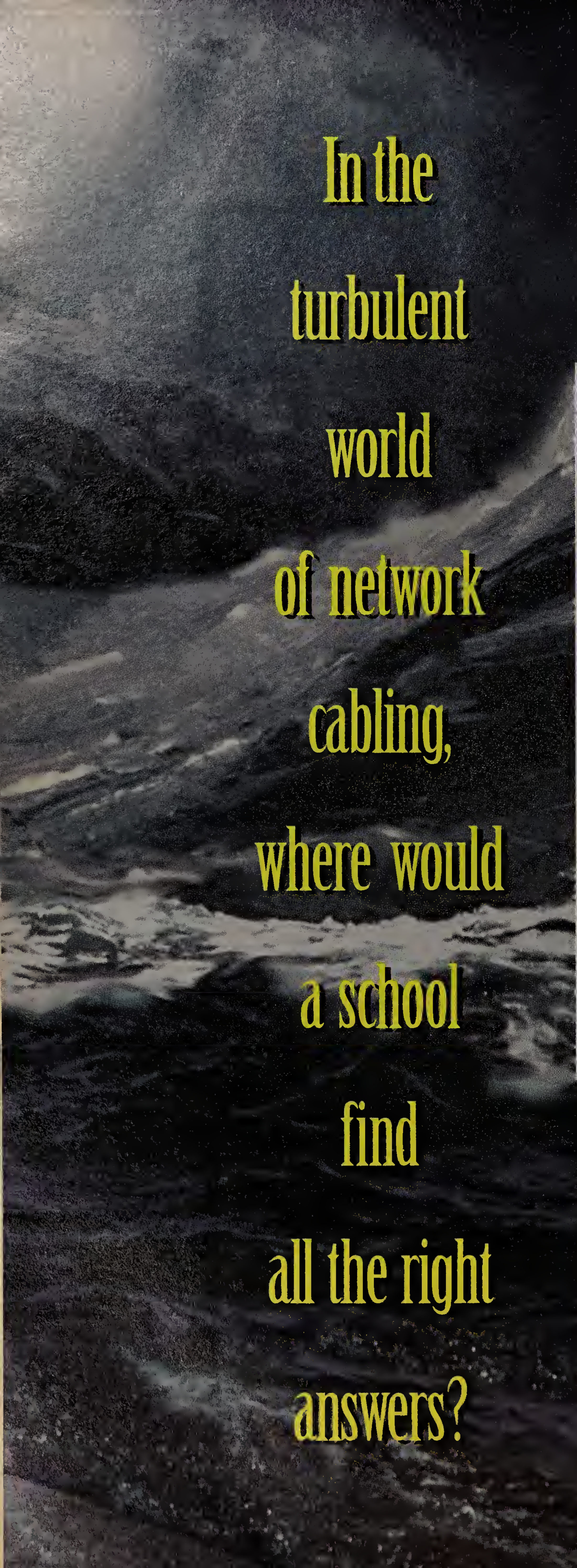

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AMP

Circle Reader Service #2

Obstacles still stand in the way of ATM's move to the desktop

Second in a two-part series about the use of Asynchronous Transfer Mode technology on the LAN.

By Paul Korzeniowski

ATM is beginning to penetrate backbone networks, but it must knock down several barriers if it wants to make a dent in the desktop market.

With its ability to handle voice, data and video, ATM holds forth considerable promise for desktop workers who need to transmit complex, bandwidth-intensive multimedia applications. But exploiting that promise will prove difficult since ATM desktop technology is costly and incompatible with existing systems.

Millions of users work with applications operating on Ethernet, Fiber Distributed Data Interface and token-ring nets. These users need a clear migration path to ATM. Without one, the technology will not make much of an impact at the desktop.

Two solutions are possible. The first is development of standards so non-ATM transmissions flow on ATM networks. A few vendors already deliver proprietary products capable of supporting Ethernet transmissions, and the ATM Forum has been working on LAN emulation standards. Vendors should deliver standards-based products by the end of the year.

But this approach may prove to be inefficient. "Running Ethernet on ATM offers users limited value. The base technology is still Ethernet, so the only benefit they receive is faster transmission speed," said Anthony Alles, ATM product-line manager at Cisco Systems, Inc. of Menlo Park, Calif.

A second option is for software suppliers to build applications specifically for ATM networks. Few developers have yet taken on that challenge, in large part because they may have trouble recouping their investment from the small base of ATM customers. Development costs are high because there are only a limited number of programming tools available.

So far, only a few start-up suppliers have tailored their applications to ATM networks. To date, no one has hit on a killer application that would force many companies to move to ATM.

The almighty dollar

Cost has been another inhibitor. Ethernet became pervasive because of its low price, and with adapter cards now selling for as little as $75, its popularity continues. By comparison, ATM cards cost at least $900 for PCs and from $1,200 to $2,000 for Sun Microsystems, Inc. workstations.

Because of the limitations, desktop ATM has made its way into a few niche areas rather than throughout the general business community. It has begun creeping from the backbone (*NW*, Sept. 11, page 1L) to the desktop in a few distinct vertical markets, including financial services firms, medical institutions and universities.

At Donaldson, Lufkin & Jenrette, a New York-based financial services firm, the ability to outfit desktops with ATM adapter cards factored significantly into its backbone switch choice. The company has more than 4,000 users working on PCs, Tandem Computers, Inc. fault-tolerant systems, IBM mainframes and Unix workstations.

In April 1994, the firm wanted to upgrade an FDDI network used by 35 traders on the floor. It decided to give them 155M bit/sec ATM connections to their desktops.

"The federal government changed a regulation regarding overdrafts, so the faster we could process transactions, the lower our service charges would become," said Scott Knipfing, a senior systems analyst at the firm. "We did not want our traders experiencing any network delays."

After the company evaluated ATM switches from Bay Networks, Inc. and Fore Systems, Inc., Donaldson, Lufkin & Jenrette selected the latter's ASX-200. Fore, located in Warrendale, Pa., offered a complete system with adapters and an integrated network management system.

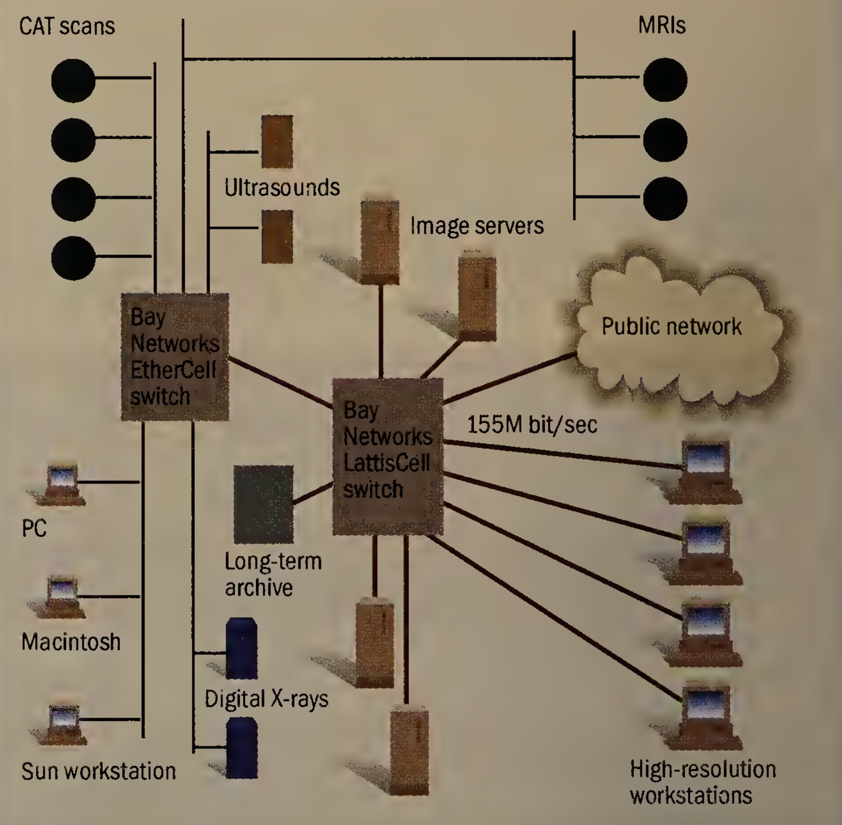
In addition, the Fore switch has a nonblocking architecture. "We expect to run videoconferencing applications on the network, and a nonblocking switch will insure no pictures are disrupted," Knipfing explained.

The ATM image

Bay Networks' matrix switch architecture, as well as its easy configurability and standards

Getting the ATM picture at Duke

The radiology department at the Duke University Medical Center uses 155M bit/sec ATM connections so users at high-resolution workstations can view a variety of medical images, including CAT scans and MRIs.



Tool offers preferred way to manage NDS systems

By Mark Gibbs

When Novell, Inc. released NetWare Directory Services (NDS) in 1993, it achieved a level of systemwide integration that placed the product at the forefront of the directory services market, but it has taken a small start-up company to make NDS management bearable.

NDS, which Novell introduced in 1993 as a key feature of the NetWare 4 environment, differs in scope from the services offered by competing network vendors. For example, while Banyan Systems, Inc.'s StreetTalk directory is elegant and effective, it has a rigid naming structure limited to only three levels (object name, department and organization).

Upside, downside

In comparison to StreetTalk, NDS is a monster. Based on the CCITT X.500 directory services model, it allows for very flexible naming structures. An NDS directory tree can reflect the architecture of almost any corporation at the organizational or functional levels, or for that matter, both levels simultaneously.

NDS offers a rigorously — and relentlessly — global object-oriented system that supports a single logon to the network and encompasses security, electronic mail and, most critically, fault tolerance. This level of sophistication brings tremendous benefits to network management but also brings a consequent downside: perceived complexity.

The problem is that when the environments of two or more servers are integrated, the sheer amount of data makes the management task appear more difficult. (It is debatable whether the complexity of dealing with a comprehensive global directory system is, in reality, greater than that of managing a number of isolated servers.)

This perceived complexity was one of the key factors that slowed the adoption of NetWare 4. And worse still, the apparent difficulty of working with NDS was reinforced by Novell's functionally weak utilities for the directory system.

Into this market came a start-up called Preferred Systems, Inc. of West Haven, Conn. PSI is experienced with NetWare at the systems levels and now, after two releases, has produced a tool that makes NDS management considerably easier. The tool, called DS Standard Version 2, is a Windows-based utility that makes everything from migration from bindery-based NetWare servers — that is, NetWare Versions 2.X and 3.X — to day-to-day management and configuration much easier.

In our testing, we found that DS Standard was simple to install, well organized and effective. In fact, the thought of managing an NDS system of any significant size without this tool is unappealing.

Flying the standard

DS Standard Version 2, which comes on four 3.5-inch disks, takes all of 10 minutes to install. The most complex part of this straightforward task is the keying in of two 15-character serial numbers.

The application itself seems to run slowly, but that is largely due to the complexity of analyzing the NDS database structures.

Once launched, DS Standard presents a simple Windows interface. Selecting the New View menu option enables the user to open either an empty window or one containing the data discovered from bindery or NDS-based servers.

All of the objects that exist in the directory system are represented in an inverted tree model using Novell's standard NDS icons. The tree can be restructured and new objects added by dragging and dropping the icons.

Thus, if a bindery discover has been done, objects can be dragged from the bindery to the NDS model under development. DS Standard can copy objects as well as consolidate and merge them. This allows groups of users who are defined on different NetWare 4 servers to be easily

See NDS, *page 12L*

DS Standard makes the grade

Product:	DS Standard Version 2
Summary:	Indispensable for the maintenance and management of Novell NetWare Directory Services systems
Pricing:	From $295 for a 10-user license to $4,495 for a 1,000-user license
Platforms:	Windows 3.1, NetWare 2.X and 3.X (for migration) and 4.X (for management)
Vendor:	Preferred Systems, West Haven, Conn. (800) 222-7638, (203) 937-3000

For the test, DS Standard was run on a PC clone running Windows for Workgroups on DOS 6.0. The file server was a J&L Information Systems' Pentium-based machine running NetWare 4.1.

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conformance, won the LattisCell ATM switch a place at Duke University Medical Center's radiology department, said Louis Humphrey, director of radiology informatics.

There, ATM allows a group of 10 users to exchange complex medical images generated on Sun SPARCstations over 155M bit/sec desktop and backbone connections (see graphic, page 6L).

The initial installation went smoothly, and the users are content with the network's performance. Humphrey said he anticipates expanding the department's desktop ATM connections in the next 12 to 18 months if he can find attractively priced adapter cards for PCs or Silicon Graphics, Inc. workstations.

Desktop ATM pricing would have to be cut in half for the department to deploy it, Humphrey said. "We cannot justify spending $1,500 to $2,000 for each connection," he added.

Telltale signs

The department's timing may be fortuitous. Adapter card costs fell by 50% this year, and signs indicate the downward spiral will continue through next year.

> *Switched Ethernet, which provides 10M bit/sec of bandwidth to each user, may represent the biggest competitor to desktop ATM.*

For one, competition is increasing. Fore moved into the ATM adapter card arena simply because other suppliers were not delivering such wares. But this year, at least three vendors — Interphase, Inc., PMC-Sierra, Inc. and 3Com Corp. — began shipping ATM adapters.

What's more, vendors are developing new specifications aimed at cutting the cost of desktop connections. Last year, a group of suppliers lead by IBM began working on a 25M bit/sec version of ATM that runs on copper wiring rather than more expensive fiber cabling.

The ATM Forum blessed the work as a standard, and vendors expect to deliver compliant products by the end of the year for about $350.

While the price is attractive, the 25M bit/sec technology has a downside. A company has to swap out its adapter cards, wiring hub ports and management software but only receives throughput similar in speed to switched Ethernet, noted Rick Malone, a principal of Vertical Systems Group, a consulting firm in Dedham, Mass.

The competition

Switched Ethernet, which provides 10M bit/sec of bandwidth to each user, may represent the biggest competitor to desktop ATM. Its deployment is less disruptive than ATM — for the companies that already run Ethernet shops, the 10M bit/sec switching technology can be added without changing adapter cards or management software.

Ethernet also offers a high-speed growth path. Fast Ethernet, which raises the transmission speed to 100M bit/sec, has quickly become an attractive option for companies in need of more speed.

In addition, the technology is inexpensive: Fast Ethernet adapter cards cost approximately $350 and could sell for less when 25M bit/sec ATM connections arrive.

Consequently, switched Ethernet will emerge as a more popular desktop technology than ATM. Vertical Systems Group estimates that worldwide revenue from switched Ethernet switches and wiring hubs will shoot from $291 million in 1995 to $2.1 billion in 1998.

Application-dependent

But companies will find ATM attractive for specific applications. "Multimedia and videoconferencing technology is emerging, and ATM offers corporations the best method of supporting those applications," said Terry Robinson, a product manager at Chipcom Corp. of Southborough, Mass.

Vertical Systems Group also is bullish on ATM's future. It projects that worldwide ATM switch and wiring hub revenue will rise from $159.1 million in 1994 to $947.9 million in 1998.

"ATM is great technology for applications with special requirements, such as high-speed transmission or multimedia support," said Knipfing of Donaldson, Lufkin & Jenrette. "I won't expect it to be used for daily applications, like electronic mail or spreadsheets. There, the technology would be overkill."

Korzeniowski is a freelance writer in Malden, Mass., who specializes in networking and data communications topics.

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Viruses

Continued from page 1L

Often, viruses are spread inadvertently by sharing diskettes between home and office, between vendors and customers or by using demonstration software. PC hardware technicians also unintentionally spread them.

Jimmy Kuo, senior virus researcher at McAfee, sees a strong correlation between computer viruses and their biological counterparts. "The strength of the computer virus is in direct contact," according to Kuo.

Catching a virus

Each of the top 12 viruses reported last year was a boot sector virus, according to Tippett. Such a virus infects the boot sector of the PC hard drive and can spread to any PC sector on a computer system that becomes infected when booted with a tainted floppy disk. While boot sector viruses do not actually attack the network, they can infect the file server.

Other PC virus types include file, stealth, polymorphic and word macros. File viruses infect executable files — .EXE, .COM and .OVL extensions, for example — and operating system files, introducing system bugs or causing windows programs to hang.

Stealth viruses, which are partly memory-resident, hide the changes they make to the operating system, directory structures and file sizes. Polymorphic viruses alter their appearance with each infection and, therefore, often defy detection.

The LAN is especially susceptible to multipartite and word macro viruses. Multipartite viruses infect both executable files and boot sectors, using a combination of techniques that makes detection difficult. The newly discovered word macro virus infects a macro in Microsoft Word or Excel, for example, and attaches itself to documents. As the documents move across the network, the virus spreads.

"Standard network protocols cannot be used to prevent the spread of the word macro virus," Tippett cautioned. "Its discovery in August has changed the entire paradigm of computer virus protection because it is a network-enabled virus. This is real and growing, and we have no idea how fast."

Curing a virus

What's the best approach to tackling the computer virus problem? The obvious first step is to choose the appropriate antivirus package to protect the LAN server from infection. Many server-based packages, such as Cheyenne Software, Inc.'s InocuLAN and EliaShim, Inc.'s ViruSafe/NLM, use NetWare Loadable Modules (NLM) that reside on the server and scan for programs written or copied to the server.

Catching a virus

Vendor/Phone	Product
Cheyenne Software (800) 243-9462	InocuLAN for NetWare, InocuLAN for Windows NT
EliaShim (800) 677-1587 (813) 744-5177	ViruSafe, ViruSafe/LAN, ViruSafe/NLM
IBM (800) 742-2493	IBM AntiVirus products and services
Intel (800) 538-3373	LANDesk Virus Protect 3.0
McAfee (408) 988-3832	NetShield and VirusScan
Reflex (206) 776-2524	Disknet
Symantec (408) 253-9600	Norton AntiVirus and AntiVirus for Windows 95
Thompson Network Software (800) 521-8849 (404) 971-8900	Doctor Anti-Virus for NetWare and Doctor Anti-Virus for Windows 95

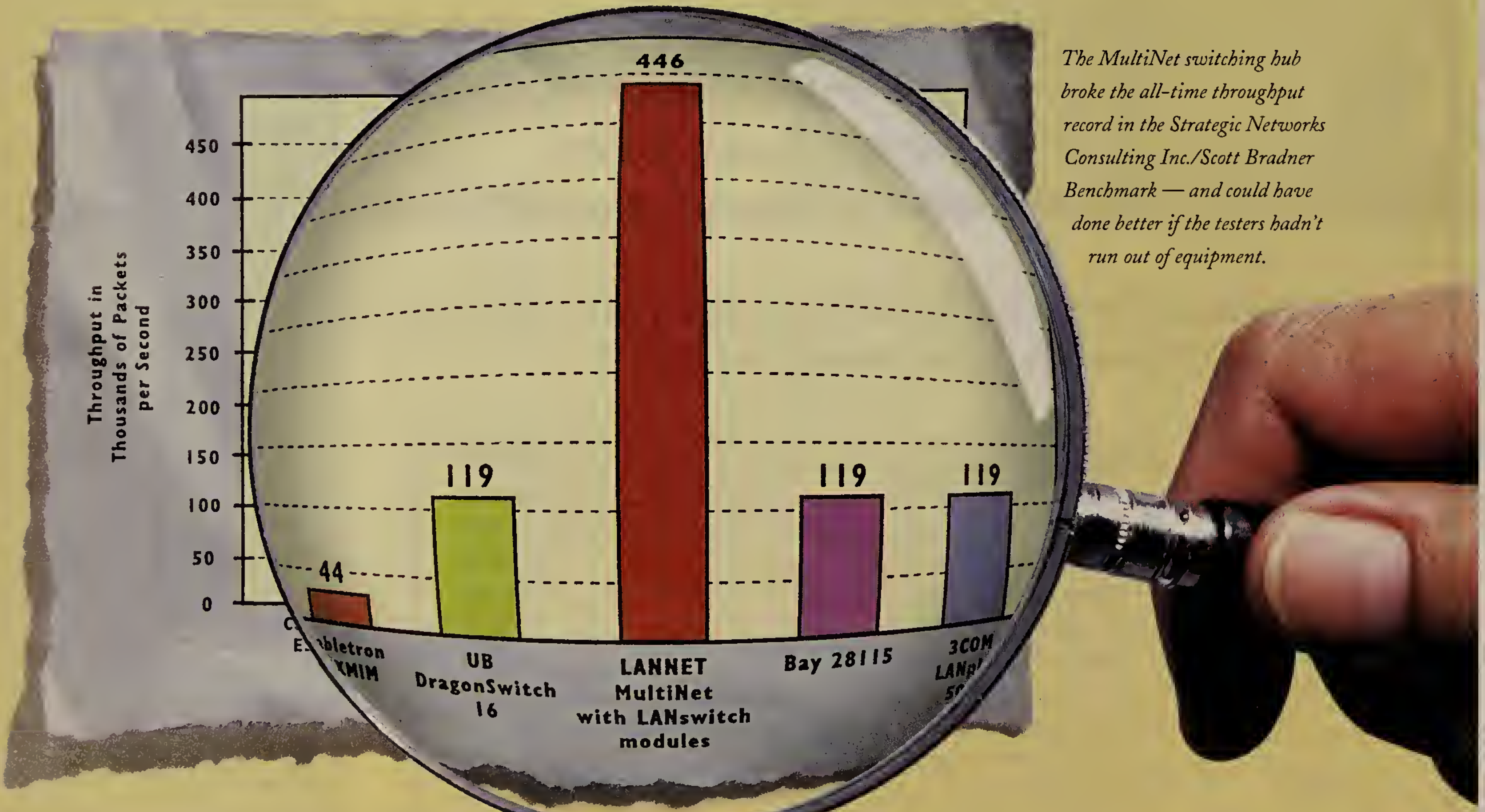
Some packages can be configured centrally to scan memory, hard disks, floppy drives and network servers in order to detect and remove viruses. Most scanners incorporate some sort of signature checking, which uses a set of code to identify the type and origin of the virus via the signature it leaves within an infected file. Another approach, used by Reflex, Inc.'s Disknet, is to scan floppy diskettes and not allow them to be accessed until they are authorized as virusfree.

"Effective virus protection requires more than simply the purchase of antivirus programs," said Steven White, senior manager of the Massively Distributed Group at IBM's Watson Research Center. "Viruses tend to spread locally, and it's possible to continually reinfect the computers."

Controlling a virus

Acquiring a virus from a diskette rather than from the Internet is the greatest concern of Erik Goldoff, a computer special-

See **Viruses**, *page 10L*



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Viruses

Continued from page 8L

ist at a division of the Center for Disease Control (CDC) in Atlanta. He points to boot sector viruses as a particular problem because the division has many interns and students who bring in data diskettes from university laboratories.

The CDC has inplemented a three-pronged virus protection program on a 65-node Novell, Inc. NetWare 3.11 LAN, which connects to a 7,000-node nationwide network. On the server, it runs Intel Corp.'s LANDesk software, which uses a signature checker to prevent commonly known viruses from entering the network. It uses McAfee's VirusScan to check the hard drive before users log on to the system and whenever the system is rebooted. And supervisor accounts use the operating system's TSR and Checksum programs to check for virus activity.

Raising employee consciousness has enabled Scientific-Atlanta, Inc. to successfully isolate viruses before they inflict damage, according to Jim Capps, manager of information protection at the Atlanta-based manufacturing company.

"Antiviral protection is part of our overall information protection architecture," Capps said. "It's important that people include virus protection as one element of a total information security architecture policy."

About 4 1/2 years ago, Scientific-Atlanta began using Thompson Network Systems' Doctor Anti-Virus System to protect servers and more than 3,000 DOS, Windows and Unix workstations worldwide from viruses. The software has detected viruses on files carried between the home and the office, shrink-wrapped software and demonstration copies distributed at conferences, Capps said.

Creation of a computer emergency response team and a strong virus protection program has proved effective for U.S. Trust Corp. in New York. The firm has standardized on IBM's AntiVirus products and services, trained its technicians on antivirus protection and sensitized employees about the importance of scanning every diskette for infections.

"When your policy is really good, it's easy to find viruses before they can infect machines," said Ralph Langham, computer security officer at U.S. Trust. "Key to our success is a no-fault policy, where no one is blamed for introducing a virus."

Before this program was introduced 2 1/2 years ago, approximately 12 machines per incident were infected. U.S. Trust has significantly reduced its number of virus infections: Last year, it experienced only 51 incidents per 1,000 computers, with a 0.37% infection rate per machine per incident.

Another company that has almost effectively eliminated infection at its New York corporate headquarters is Cunard Line, Ltd. The company has standardized on Reflex's Disknet software, said Steve Wilson, a PC application specialist with Cunard, whose antivirus program requires each user to scan data files before reading a disk and to bring executable files to the IT department as a central scanning point.

Yet firms with virus protection programs should refrain from becoming too confident. Take the case of Aon Corp., a Chicago-based insurance company that experienced virus problems despite an established antivirus program. When new strains of computer viruses appeared, the company realized the need for additional precautions to protect its network.

Frank Annerino, vice president of security at Aon, attributed this virus problem to a significant rise in PC users and increased diskette exchange with vendors and customers. He also said employees were not scanning diskettes consistently, despite the company's security policy.

"We had figured that as a staid, traditional business, we wouldn't need to worry about people bringing in stuff with viruses," Annerino said. "We became a little smug, but that changed approximately a year ago when we saw new viruses coming into the company."

Annerino points to situations where entire departments and remote sites were

See Viruses, *page 12L*

Top 10 viruses

The National Computer Security Association has identified the following viruses as the most widespread:

- ▶ FORM
- ▶ ANTIEXE
- ▶ STEALTH_BOOT.B
- ▶ ANTICMOS
- ▶ PARITY_BOOT.B
- ▶ MONKEY.B
- ▶ B1
- ▶ V_SIGN
- ▶ MONKEY.A
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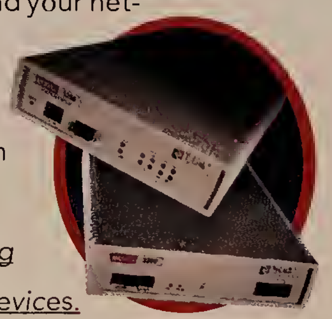

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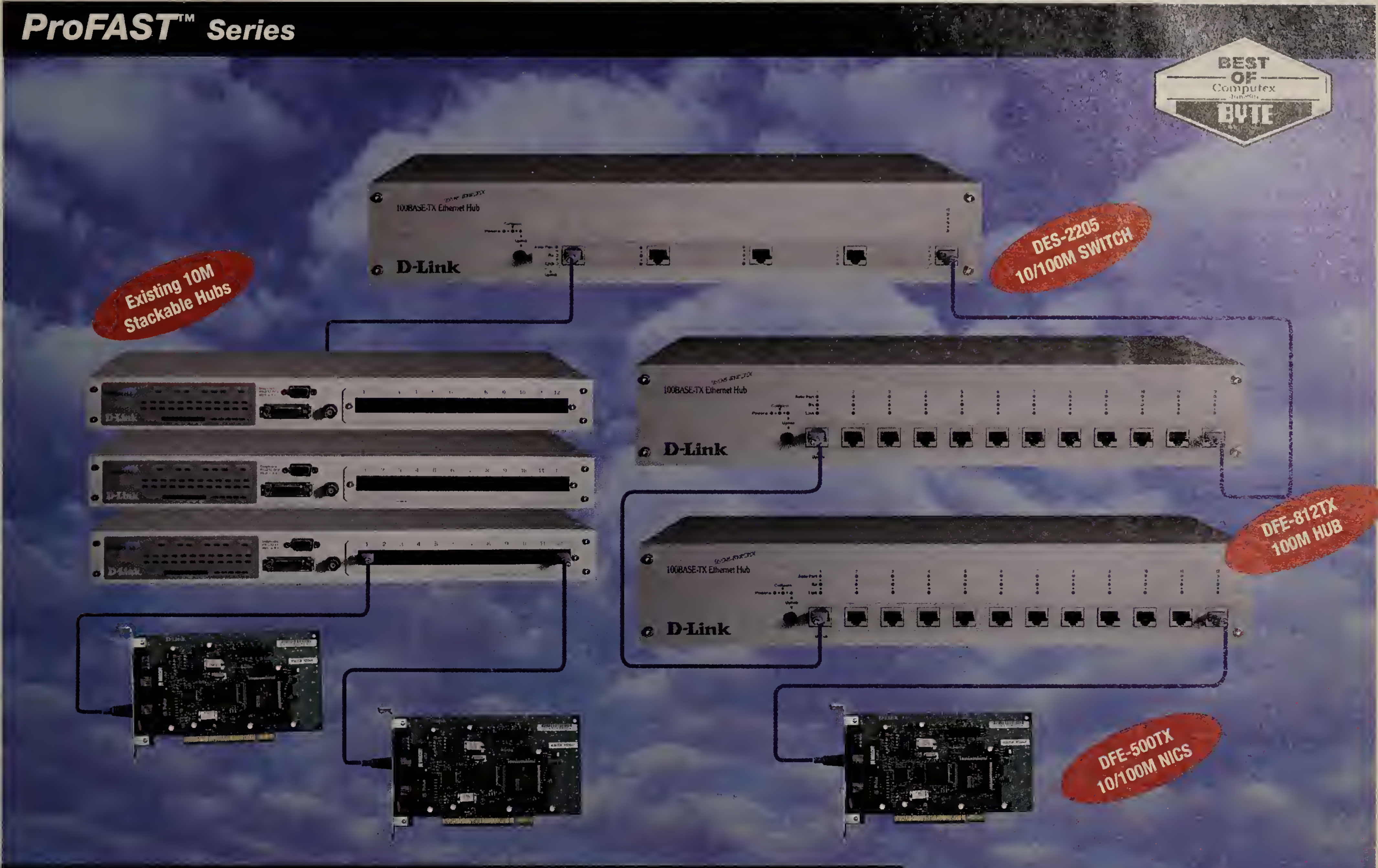

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Viruses

Continued from page 10L

shut down because of a virus. "We have had situations where people have spent days trying to recover data," he said.

Aon has installed Reflex's Disknet, which proactively scans 2,000 PCs worldwide and file servers once a day to check for viruses before they can be written to a hard drive. The company also uses McAfee's NetShield, an NLM-based product that checks for signatures the virus leaves within an infected file.

Since viruses are created at the rate of three to five each day, the trick is to detect, or minimally contain, viruses before they infect the system. Users should not rely on antivirus programs preinstalled on PC operating systems because they become dated quickly and may not be able to detect new or more complex virus strains.

Antivirus software alone will not solve this growing problem. It is important to develop a total security program that educates users about the need to scan their PCs on an continual, uniform basis, especially when new diskettes are introduced.

Organizations with multiple site locations also should consider a central virus management program with trained experts at the main site. Another approach is to supplement this effort with a team of on-call technical virus specialists.

Jacobs is a consultant and writer in Framingham, Mass., who specializes in networking. She can be reached via the Internet at pjacobs@world.std.com.

NDS

Continued from page 6L

migrated to an NDS environment.

When an NDS tree is going to be updated from a DS Standard copy, it is vital to verify the copy's consistency and coherence.

DS Standard verifies a number of parameters before performing a configuration. For example, it will try to verify that at least one of the operators referenced by a print queue or server really exists. If not, the software ensures that the user account of the DS Standard operator is used.

Other preconfiguration checks include searches for the existence of physical hardware referenced by an NDS object and missing links.

Toiling with tools

DS Standard includes some well-thought-out capabilities, including the ability to perform global search and replace on the NDS tree. For instance, a network manager could change every user account from not requiring a password to requiring a password of at least eight characters. This kind of global replace feature lets net managers establish and enforce enterprisewide standards on any object attributes.

An extension of that idea is the ability to apply a template to a set of objects. A network manager can select a number of objects and, by invoking the template function, apply one or more attributes of another object to them. For example, the permissible logon times and intruder detection configuration for a prototype user account could be applied to all accounts on the system to ensure consistency and adherence to corporate policies. This technique also has been implemented for object references. Because objects can point to one another, a search-and-replace function that operates over the entire NDS tree is a major time-saver.

Standard and deliver

Importantly, DS Standard does not perform the object additions, deletions and modifications on the original, live NDS system. When a new window is opened or a discover process retrieves the NDS data, the tool creates a database. It does not commit the changes to NDS until it is specifically instructed to do so.

A network manager can work on an NDS system off-line and choose if and when changes are to be implemented. This means NDS design can be developed and committed when staff are off the network — a vital capability since reconfiguring an NDS system is slow and processor-intensive.

DS Standard also produces reports about the 15 operations it performs. Some of these reports are useful as audit trails or change management logs, while others make basic reporting a simple task.

In summary, DS Standard is a useful utility that, in the course of our testing, appeared to be very stable.

Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or via the Internet at mgibbs@gibbs.com.

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THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs, Distributors)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)* ____________

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)* ____________

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:
B. I plan to purchase the following products/services:

A B
☐ 100 ☐ LOCAL-AREA NETWORKS
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ Network Op. Sys. Software
☐ 03. ☐ LAN Storage/Backup
☐ 04. ☐ Optical LAN Storage/Backup
☐ 05. ☐ Disk LAN Storage/Backup
☐ 06. ☐ Tape LAN Storage/Backup
☐ 07. ☐ RAID LAN Storage/Backup
☐ 08. ☐ Network Test/Diagnostic Tools
☐ 09. ☐ Cables, Connectors, Baluns
☐ 10. ☐ UPS
☐ 11. ☐ Network Interface Cards
☐ 12. ☐ Peer-to-Peer LANs
☐ 13. ☐ SNMP Network Management
☐ 14. ☐ ATM Switches
☐ 15. ☐ Token-Ring Switches
☐ 16. ☐ Ethernet Switches
☐ 17. ☐ Remote LAN Access/Communications Servers
☐ 18. ☐ Superservers
☐ 19. ☐ File/Application Servers
☐ 20. ☐ Print Servers

A B
☐ 101 ☐ INTERNETWORKING
☐ 21. ☐ Bridges
☐ 22. ☐ Routers
☐ 23. ☐ Bridge/Router
☐ 24. ☐ Gateways
☐ 25. ☐ Intelligent Hubs/Stackables

A B
☐ 102 ☐ COMPUTERS/PERIPHERALS
☐ 26. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 27. ☐ Micros/PCs
☐ 28. ☐ Minis
☐ 29. ☐ Mainframes
☐ 30. ☐ Workstations
☐ 31. ☐ Terminals
☐ 32. ☐ Printers
☐ 33. ☐ Cluster Controllers
☐ 34. ☐ Monitors
☐ 35. ☐ Fax/Modem Boards

A B
☐ 103 ☐ REMOTE/WIRELESS COMPUTING
☐ 36. ☐ PDAs
☐ 37. ☐ PCMCIA Devices
☐ 38. ☐ Wireless Data Services
☐ 39. ☐ Wireless Data Equipment
☐ 40. ☐ Wireless LANs
☐ 41. ☐ Cellular Equipment & Services

A B
☐ 104 ☐ INTERNET/ELECTRONIC COMMERCE
☐ 42. ☐ Internet Access Providers
☐ 43. ☐ Firewalls
☐ 44 ☐ Web Servers/Browsers
☐ 45. ☐ Internet Software Tools

A B
☐ 105 ☐ SOFTWARE/APPLICATIONS
☐ 46. ☐ Network Management
☐ 47. ☐ Systems Management
☐ 48. ☐ Security
☐ 49. ☐ Communications Software
☐ 50. ☐ Terminal Emulation
☐ 51. ☐ Word Processing
☐ 52. ☐ Operating Systems
☐ 53. ☐ Client/Server Applications Development
☐ 54. ☐ Database Management/RDBMS
☐ 55. ☐ Spreadsheet
☐ 56. ☐ Groupware
☐ 57. ☐ EDI
☐ 58. ☐ E-mail
☐ 59. ☐ Windows/Graphical User Interface
☐ 60. ☐ Multimedia
☐ 61. ☐ Graphics/DTP
☐ 62. ☐ Remote Access
☐ 63. ☐ Imaging
☐ 64. ☐ Suites
☐ 65. ☐ Middleware
☐ 66. ☐ Document Management
☐ 67. ☐ Database Server
☐ 68. ☐ Site Metering Tools
☐ 69. ☐ Computer-Integrated Telephony (CIT)

A B
☐ 106 ☐ WIDE-AREA NETWORK EQUIPMENT & SERVICES
☐ 70. ☐ Frame Relay Equip./Services
☐ 71. ☐ Modems
☐ 72. ☐ FT-1/T-1/T-3 Multiplexers
☐ 73. ☐ FT-1/T-1/T-3 Services
☐ 74. ☐ SONET
☐ 75. ☐ Inverse Multiplexers
☐ 76. ☐ SMDS
☐ 77. ☐ Asynchronous Transfer Mode
☐ 78. ☐ Diagnostic/Test Equipment
☐ 79. ☐ DSU/CSU
☐ 80. ☐ VSAT/Satellite
☐ 81. ☐ ISDN Equipment & Services
☐ 82. ☐ PBXs
☐ 83. ☐ Voice Mail/Response
☐ 84. ☐ Videoconferencing
☐ 85. ☐ Leased Lines
☐ 86. ☐ Switched Data
☐ 87. ☐ E-mail/On-line Services
☐ 88. ☐ 800/900/MTS Services
☐ 89. ☐ Virtual Networks
☐ 90. ☐ Outsourcing/Systems Integration Services
☐ 91. ☐ Education/Training Services

☐ 92. ☐ None of the above (1-91)

6 What is the total number of LANs, workstations/nodes at this location/in your organization?

At this location:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

Entire organization:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

A B
☐ 55 ☐ NETWORK ARCHITECTURES
☐ 01. ☐ SNA
☐ 02. ☐ DECnet
☐ 03. ☐ TCP/IP
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ AppleTalk
☐ 08. ☐ NFS
☐ 09. ☐ Other *(please specify)* ____________

A B
☐ 56 ☐ NETWORK OPERATING SYSTEM
☐ 10. ☐ Microsoft (LAN Manager)
☐ 11. ☐ Novell (NetWare 2.X, 3.X)
☐ 12. ☐ Novell (NetWare 4.X)
☐ 13. ☐ Windows NT
☐ 14. ☐ Windows NT/Advanced Server
☐ 15. ☐ LocalTalk (AppleTalk)
☐ 16. ☐ Banyan (VINES)
☐ 17. ☐ IBM (LAN Server)
☐ 18. ☐ IBM (PC LAN Program)
☐ 19. ☐ Artisoft (LANtastic)
☐ 20. ☐ Digital (Pathworks)
☐ 21. ☐ Other *(please specify)* ____________

A B
☐ 57 ☐ LAN ENVIRONMENT
☐ 22. ☐ 4M Token Ring
☐ 23. ☐ 16M Token Ring
☐ 24. ☐ Ethernet
☐ 25. ☐ 100M Ethernet
☐ 26. ☐ StarLAN
☐ 27. ☐ FDDI
☐ 28. ☐ LocalTalk
☐ 29. ☐ 10Base-T
☐ 30. ☐ ATM
☐ 31. ☐ Other *(please specify)* ____________

A B
☐ 58 ☐ COMPUTER OPERATING SYSTEM
☐ 32. ☐ DOS
☐ 33. ☐ Unix/Xenix/AIX
☐ 34. ☐ OS/2
☐ 35. ☐ OS/2 Warp
☐ 36. ☐ IBM MVS
☐ 37. ☐ IBM VM
☐ 38. ☐ Digital VMS
☐ 39. ☐ Macintosh
☐ 40. ☐ Windows
☐ 41. ☐ Windows 95
☐ 42. ☐ X Window System
☐ 43. ☐ Solaris
☐ 44. ☐ Other *(please specify)* ____________

☐ 45. ☐ None of the above (1-44)

8 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

Mainframes	A – Installed	B – Planned
1. IBM	☐	☐
2. Amdahl	☐	☐
3. Cray	☐	☐
4. Hitachi	☐	☐
5. Unisys	☐	☐

Minis	C – Installed	D – Planned
1. IBM	☐	☐
2. Digital	☐	☐
3. Tandem	☐	☐
4. Unisys	☐	☐
5. AT&T GIS	☐	☐
6. HP	☐	☐
7. Data General	☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At this location:		Entire organization:	
	E – Servers	F – Clients/Nodes	G – Servers	H – Clients/Nodes
1. Power PC				
2. Power Macintosh				
3. Macintosh (Other)				
4. Pentium-based				
5. 80486-based				
6. 80386-based				
7. 80286-based				
8. RISC-based workstations				
9. Other				

11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million or more
02. ☐ $50 million - $99.9 million
03. ☐ $25 million - $49.9 million
04. ☐ $20 million - $24.9 million
05. ☐ $10 million - $19.9 million
06. ☐ $5 million - $9.9 million
07. ☐ $1 million - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $249,999 or less
11. ☐ None of the above

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

Entire organization:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

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Firms unveil wares to ease CD management across LANs

By Joanne Cummings

Three vendors have made available new software and hardware for storing and accessing corporate data in network-attached CD-ROM drives.

Stac Electronics of San Diego offers software that stores compressed CD-ROM information on available server hard-disk space. It is designed to provide a faster, easier alternative to networked CD-ROM drives, the company said.

The software, called CD-QuickShare, resides on DOS or Windows-based servers that have an available CD-ROM drive and free disk space. It runs on any LAN operating system, including Novell, Inc. NetWare, Microsoft Corp. Windows NT, Banyan Systems, Inc.'s VINES and IBM's LAN Manager.

The software compresses CD-ROM information loaded from the attached drive and stores it on the server's hard drive, building a library of CD-ROM images that can then be simultaneously accessed by any number of LAN users at network speed, the firm said.

CD-QuickShare consists of two applications: CD-Administrator, which lets LAN managers load and manage CDs on the network from a single location, and CD-Selector, which provides users with access to a list of available CDs. The package also includes CD-ROM metering features that track, enforce and report to the LAN administrator CD-ROM license counts and usage statistics. In addition, because the CD-ROM library is stored on the server, the software takes advantage of the network operating system security and user access rights.

CD-QuickShare costs $500 for a five-user, five CD-ROM license. Network managers can add 10 more clients or disks for $135.

CD-ROM miniserver

Microtest, Inc. of Phoenix has rolled out a CD-ROM miniserver and management software package designed for NetWare LANs.

The server, called DiscPort Plus, can be placed anywhere on the network to offer LAN users access to as many as seven CD-ROM drives and the ability to remotely change disks. The videotape-size device can be attached to any LAN-attached PC and has seven ports for CD-ROM drives.

The software, called DiscView Pro, provides CD-ROM installation, management and access utilities. It resides on DiscPort Plus and lets LAN users see and access CD libraries as if they were traditional NetWare volumes or subdirectories.

The software also includes a utility called SmartLaunch that lets users click on an icon to access all the CD-ROM applications on the server. This eliminates the need for administrators to build specialized batch files to permit users to run CD-ROMs, the firm said.

DiscPort Plus, which includes DiscView Pro, costs $1,295 for the token-ring version and $895 for the Ethernet version.

San Jose, Calif.-based Ornetix Network Products enhanced its CD Vision LAN-based CD sharing package with six features designed to cut CD management costs across an enterprise network.

The CD Vision software makes it possible for any NetWare-based PC to become a dedicated CD-ROM server supporting as many as 196 CD-ROM drives. It now provides for virtual volume mapping and automatic title mounting from anywhere on the net, as well as supports most CD tower jukeboxes, the firm said.

Interface enhancement

Ornetix also enhanced its CD Commander, an icon-based interface that provides CD Vision LAN users with CD access. The software now provides automated installation, title distribution and logical naming, as well as dynamic logon and mapping features.

CD Vision costs $1,395. CD Commander is priced at $295 as a stand-alone application and $150 when bundled with CD Vision.

©Stac Electronics: (619) 794-4300; Microtest: (800) 526-9675; Ornetix: (408) 383-7050.

Cummings is a freelance writer in Marlborough, Mass.

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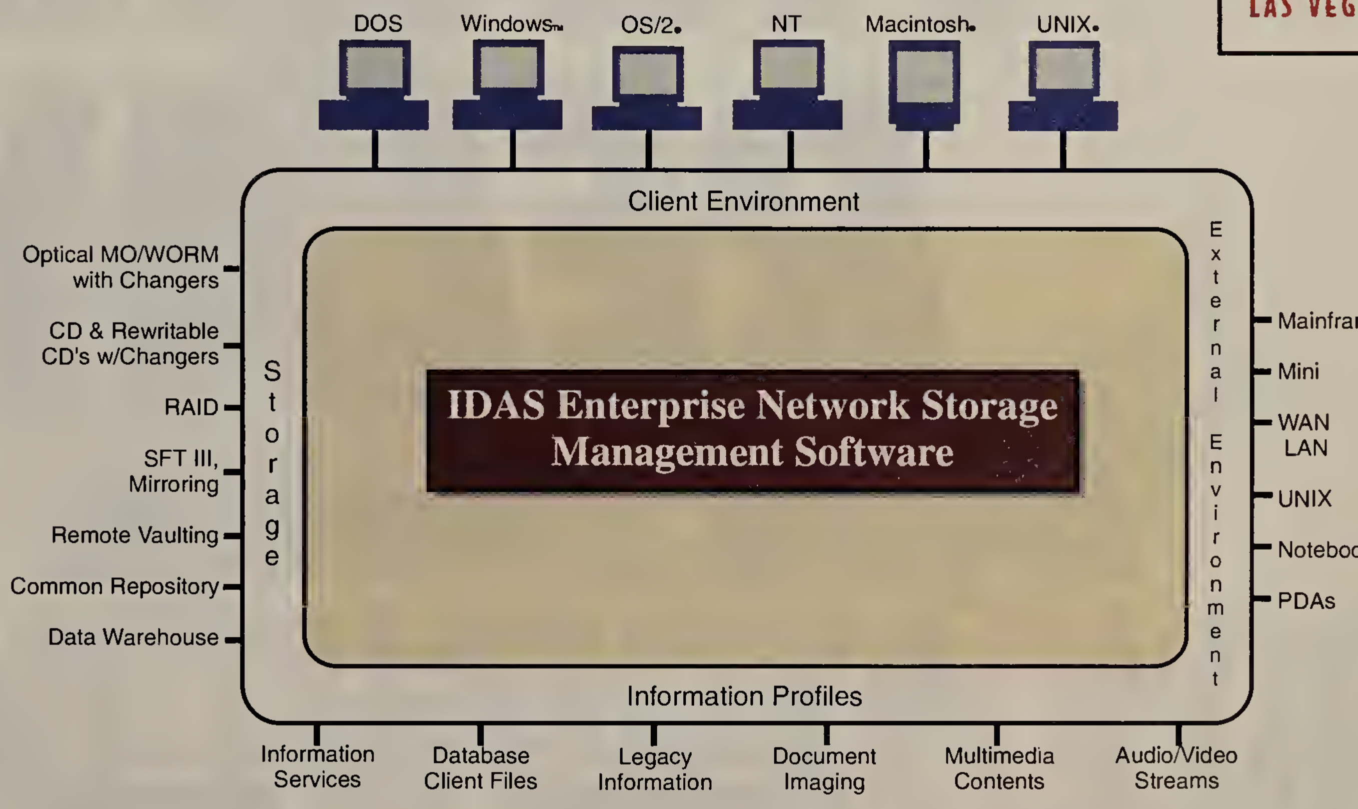

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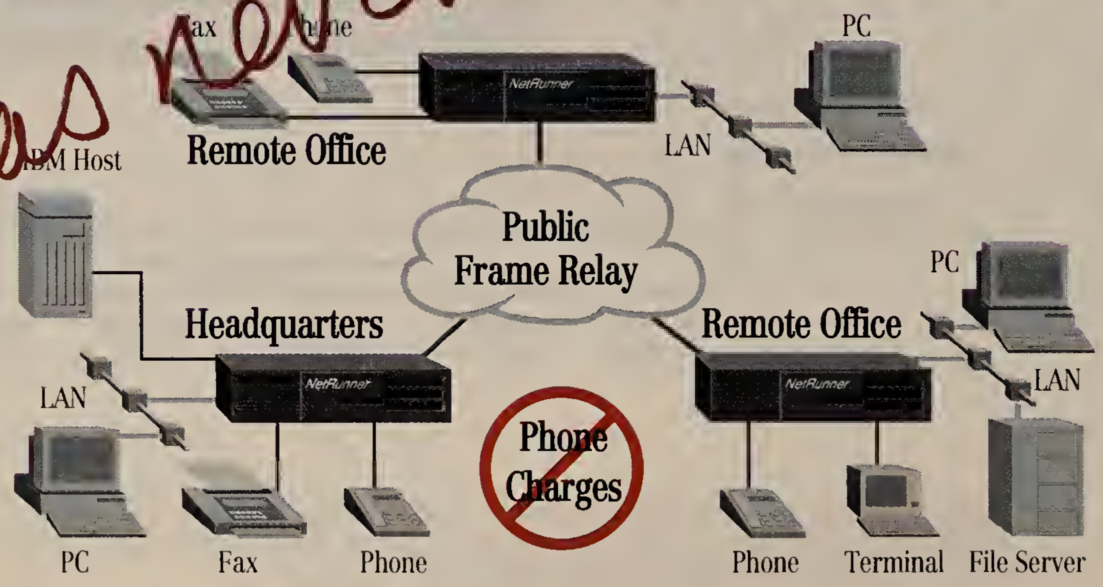

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NET RESULTS

Optimizing remote access connections helps lower bill

To some degree, it's a catch-22.

Network managers want to tie in remote sites to give all end users access to corporate LAN-based resources. But tying in a branch office can become inefficient and, as a result, an expensive project.

For example, remote users typically connect to corporate LANs at 1/2,000 of the speed available to on-site users. According to John Girard, Gartner Group's remote access guru, to overcome such limits and provide better links to the central LAN, net managers have three alternatives: generic techniques to accelerate the communications link between the remote user and the LAN; LAN-based traffic optimization methods; and message-management schemes requiring a new generation of end-user applications.

Generic optimization

The most basic techniques to optimize the remote office-to-LAN link include compression and error correction, which can be deployed regardless of application design. With compression schemes, be certain the entire payload is being compressed — not just the header information — in order to maximize the benefit.

Skip MacAskill and Melinda Le Baron

Users also should take advantage of spoofing, which lets the LAN-based portion of a remote access setup answer routine polling requests from corporate LAN servers on behalf of the remote user. This eliminates unnecessary traffic from passing over the wide-area link.

LAN-based optimization

These approaches may be used to improve performance for remote users by giving priority to remote access sessions. There are a variety of schemes available, including: priority queuing, which enables network traffic routing to be prioritized by protocol type; protocol conversion, which directs remote-user sessions into the optimal LAN protocol; custom queuing, which allocates LAN/WAN bandwidth to the most essential protocols; and policy-based routing, which allows net managers to alter pathways and system visibility in router-based internets on a per-user basis.

Application-specific optimization

These methods allow message-handling decisions to be made in the context of the application requirements. Some examples include automatic-response E-mail systems that enable end users to delegate routine file handling and report generation to an agent or server, and general-purpose groupware environments — such as Lotus Development Corp. Notes — that manage document transfer, replication and synchronization.

Applications can also be configured to split message content according to priority, sending the most important pieces through high-cost, secure, low-bandwidth pipes and the remainder through low-cost, higher bandwidth links.

Successful implementation of application-specific optimization, however, will require a complete restructuring of end-user applications and a new understanding of workflow in the enterprise.

Unless your staff is equipped to take on the challenge of implementing such application-specific optimization strategies, your group might be best off exploring the generic and LAN-based optimization approaches.

That's because the remote LAN access vendors probably will not provide application-specific optimization offerings for at least a few years.

MacAskill is a senior research analyst and Le Baron is a research director in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached by E-mail at inquiry@gartner.com or by phone at (203) 316-1111.

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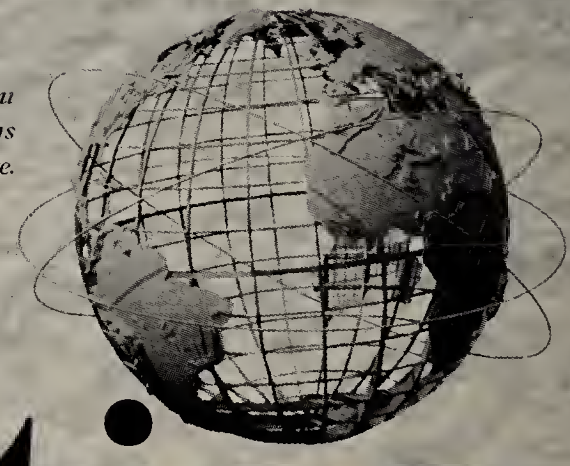

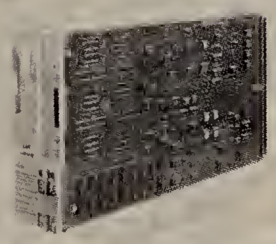

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Briefs

■ *Last week,* **Gupta Corp.** *of Menlo Park, Calif., last week announced a version of its SQLWindows development tool for SunSoft, Inc.'s Solaris. Developers will be able to build SQLWindows applications on either Windows or Unix workstations and deploy those applications on either platform.* **SQLWindows for Solaris** *will be available in November for $3,495.*

Gupta: (415) 321-9500.

■ **Vmark Software, Inc.** *in Westborough, Mass., has begun shipping uniVerse Objects, an* **OLE-compliant** *add-on for building client/server applications with tools such as Microsoft Corp.'s Visual Basic or Vmark's Object Studio. The tool works with Vmark's uniVerse relational database and is part of the uniVerse Software Development Kit, which costs $395.*

Vmark: (508) 366-3888.

■ **On Technology Corp.** *has added support for Hewlett-Packard Co. and Sun Microsystems, Inc. Unix clients and IBM OS/2 clients to its Meeting Maker XP* **group scheduling software**. *The new clients are available today in packs of 10 and 50 users. The OS/2 client sells for $99, while the Unix client sells for $198.*

On Technology: (617) 374-1400.

■ *Last week,* **NobleNet, Inc.** *in Southborough, Mass., unveiled the OneDriver ODBC Software Developers' Kit, which is designed for moving the Open Database Connectivity (ODBC) API from Windows clients to an array of networked servers. By doing so, developers can eliminate headaches associated with managing multiple ODBC drivers on numerous clients.*

Used with NobleNet's EZ-RPC SDK, the new product also lets ODBC 2.0-compliant applications call devices other than database servers.

The SDK is priced at $4,995 per database server and is priced at $250 per client for as many as 20 clients.

NobleNet: (508) 460-8222.

Show roundup

Oracle packs bigger punch into its database

By Barb Cole
Philadelphia

As expected, Oracle Corp. last week unveiled a new version of its database designed to speed up data warehousing applications.

Oracle7 Release 7.3, introduced at the International Oracle User Week conference here, features a number of enhancements aimed at improving performance of large databases on multiprocessor systems. These include a revamped optimizer that can split up work based on the number of processors and disks as well as the ability to locate data based on the value in a given column, said Carl Tsukahara, Oracle's director of marketing for server technologies.

Oracle7 Release 7.3 deliverables

- ▶ Query optimizer to balance work between multiple processors
- ▶ Parallel queries on symmetrical multiprocessing and massive parallel processing systems
- ▶ Options to store relational, text and multimedia data
- ▶ New tools for centrally managing distributed Oracle7 databases

Release 7.3, due in the first quarter of next year, also locates information stored in the databases more efficiently than previous versions, Tsukahara said. Instead of fully scanning each table involved in a query, the database will perform quicker index scans or skip tables when appropriate, he said.

While Oracle focused mainly on the data warehousing enhancements of Release 7.3, there are other significant enhancements, including a new set of systems management tools dubbed Oracle Enterprise Manager. They are for administering distributed Oracle7 databases from a central point.

Also of interest to users is that Release 7.3 lets them build a hot backup and is designed for fast recovery in the event of a system crash.

"Now you can easily copy over your production databases to a standby," said Nigel Noble, senior database administrator at London-based Churchill Insurance, Ltd. If the database crashes, it will start up a lot faster, he said.

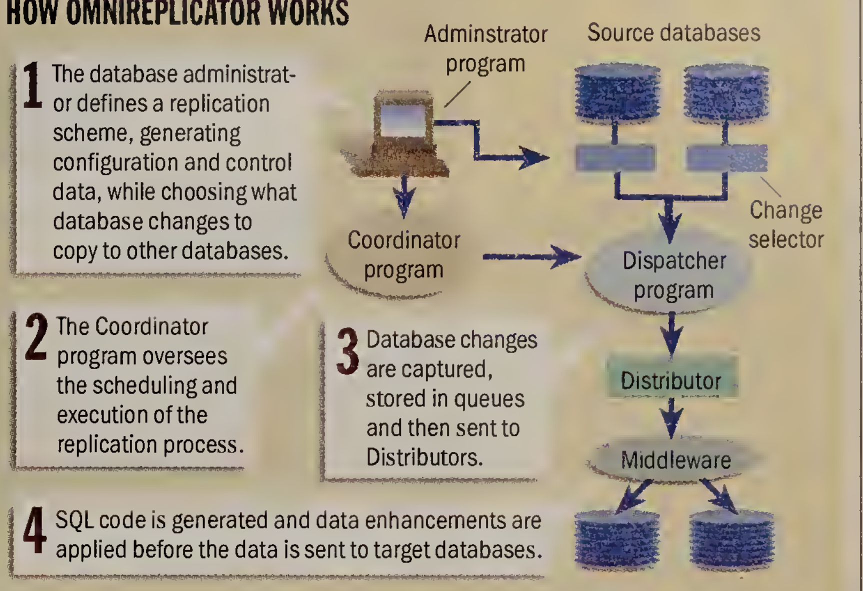
Richard Finkelstein, president of consultancy Performance Computing, Inc. in Chicago called the release significant. "It's not like there are a lot of new capabilities, but there has been a lot of fine-tuning," he said.

The biggest change is the addition of the management tools, Finkelstein said. "These are badly needed because when there's a problem now, the database is like a big, unmanageable black box," he said.

Separately, the company announced new versions of its application tools. Developer/2000 Release 1.2 will ship at year-end with new native drivers for Sybase, Inc. and Informix Software, Inc. databases. A driver for Computer Associates International, Inc. CA-Ingres databases is planned, too.

See **Oracle,** *page 53*

HOW OMNIREPLICATOR WORKS



1 The database administrator defines a replication scheme, generating configuration and control data, while choosing what database changes to copy to other databases.

2 The Coordinator program oversees the scheduling and execution of the replication process.

3 Database changes are captured, stored in queues and then sent to Distributors.

4 SQL code is generated and data enhancements are applied before the data is sent to target databases.

The Praxis software lets database managers graphically set up replication schemes, including data enhancements and transformations, among different vendors' databases.

Praxis makes a go at perfect replication

By John Cox
Framingham, Mass.

Praxis International, Inc. last week began shipping a product that lets users easily copy and convert data between different networked databases.

OmniReplicator is being touted by Praxis as a tool for building and maintaining corporate data warehouses, which consolidate data from different systems into one easy-to-understand and easy-to-access database.

Since announcing plans for the product a year ago, Praxis has added New Paradigm Software Corp.'s Copernicus technology to OmniReplicator, enabling it to transform data from one format to another using a graphical tool. This allows companies to

See **Praxis,** *page 49*

Videoconferencing for the masses is on its way

New chips and software should drive prices down.

By Joanie Wexler and Annmarie Timmins

A slew of new, dirt cheap processors and software offerings could slash the cost of desktop videoconferencing in half by the end of next year.

The fact that outfitting a workstation with videoconferencing capabilities still costs more than $1,000 has been one of the major reasons for the desktop videoconferencing market's slow start (see graphic, page 53).

Having recognized that the price needs to come down, however, videoconferencing product vendors such as PictureTel Corp. and Intel Corp., as well as chip makers such as Motorola, Inc., are introducing products they hope will make videoconferencing inexpensive enough for the masses.

"Everyone is trying to do this," said Elliot Gold, president of TeleSpan Publishing Corp. and a videoconferencing consultant. "It's a race."

He predicted that by the end of 1996, there would be a glut of standards-based videoconferencing products that will work over regular telephone lines and cost less than $400. Today, a typical desktop video system costs about $1,500 and requires the use of an ISDN line.

Chips and software

According to Gold, the effort to bring down the cost of videoconferencing is headed in three

See **Video,** *page 53*

Microsoft bundles version control tool in Visual Basic

By John Cox
Redmond, Wash.

It's easy to overlook one of the most important new enterprise application development features of Microsoft Corp.'s Visual Basic 4.0 — at least until you need it.

Microsoft has taken what had been a separate application — its version control and source code management product called SourceSafe — and blended it with the graphical user interface of the high-end Enterprise Edition of Visual Basic 4.0 and with Microsoft Visual C++ 4.0 (*NW,* Sept. 11, page 6).

By doing so, Microsoft incorporates into both tool sets a group of features that let groups of application developers work together on large projects without wrecking each other's work.

Now called Visual SourceSafe, the version control software for the first time makes use of the Windows 95 Explorer file man-

See **Visual Basic,** *page 49*

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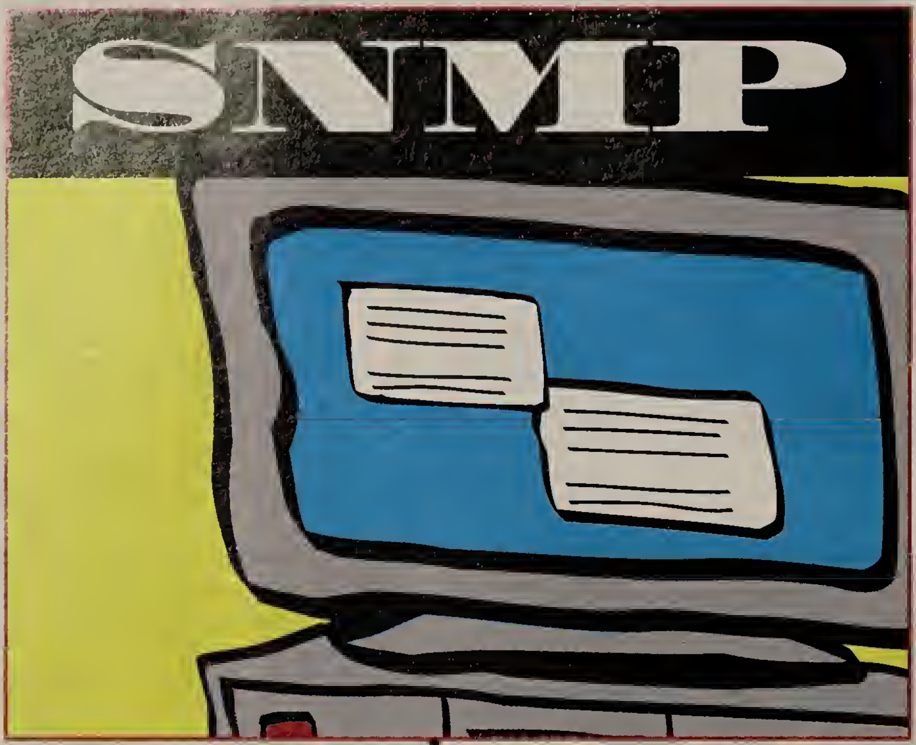

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Praxis

Continued from page 47

build data warehouses based on a common data format, which makes it easier for end users to query the system, said Russell Donovan, vice president of marketing at Praxis.

Thomson & Thomson, Inc. in Quincy, Mass., has been a beta site for OmniReplicator since early this year, according to Ron Dalgliesh, vice president of information systems at the intellectual property research firm. The company has been using the product in several ways, including copying data on order entry and accounts receivable from Sybase, Inc. SQL Server databases to the Oracle Corp. databases in Thomson & Thomson's financial and accounting departments.

"In the past, we made a copy of the database at night, dumped it [to tape] and then loaded it into Oracle," Dalgliesh said. "That was nine hours of processing. We don't have to do that anymore."

The firm is also using OmniReplicator to make duplicates of these databases to ensure data is always available. Finally, OmniReplicator also creates data subsets, which are then loaded into separate databases for running various reports.

Thomson & Thomson chose OmniReplicator over tools from Oracle and Sybase.

"For what we wanted to do, they were fairly costly," Dalgliesh said. "OmniReplicator can replicate over multiple databases and platforms, and it's very cost-competitive."

The first release of OmniReplicator can use Oracle and Sybase databases as data sources and targets. Databases from IBM, Computer Associates, Inc. and Informix Software, Inc. can also be used as target data sources.

OmniReplicator is available initially for source databases on various Unix servers. Praxis will also offer OmniReplicator Administrator, a Windows program that lets database administrators work with a mouse, menus and prompts to set up replication schemes.

OmniReplicator is priced separately for each source and target database, based on the size of the server. The price for one-way replication on workgroup servers is $12,000 for the source database and $5,000 for the target one. For mainframes, the price is $60,000 for the source database and $20,000 for the target server. Two-way replication doubles the prices.

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Visual Basic

Continued from page 47

ager and includes an array of incremental changes to make SourceSafe more convenient to use, said David Streams, SourceSafe product manager. This release also is easier to customize, incorporates more extensive on-line help, and lets users share files by dragging and dropping them.

SourceSafe can still be bought as a separate product, but developers working in Visual Basic 4.0 can make use of SourceSafe's features directly from the Visual Basic menu boxes, as well.

Keeping organized

SourceSafe organizes all the elements of an application — text documents, software testing scripts and even legacy code — into one project and keeps track of the relationships between these elements.

"It's beautifully integrated with Visual Basic 4.0, and it's very simple to use," said David Sarna, chairman of ObjectSoft Corp., an Englewood, N.J., application developer and Visual Basic 4.0 beta site. "You open your project, and [SourceSafe] will automatically check things out. It's important for helping you do group development."

Visual Basic developers such as Sarna have been stretching earlier versions of Visual Basic to build more complex applications. To do so, they have often had to use separate third-party code management products or build their own tools to store Visual Basic components, manage them and ensure that programming teams could work on them without overwriting each other's work.

To facilitate the reuse of software, SourceSafe stores all application files in a PC server-based repository. A change to any file will be picked up automatically by every application that shares the file.

Visual SourceSafe is included in the $999 Visual Basic 4.0 Enterprise Edition, or it can be bought separately for about $499 per user. Current owners of the latest editions of Visual Basic, Visual C++ and Visual Foxpro are eligible for a $100 rebate on the purchase price.

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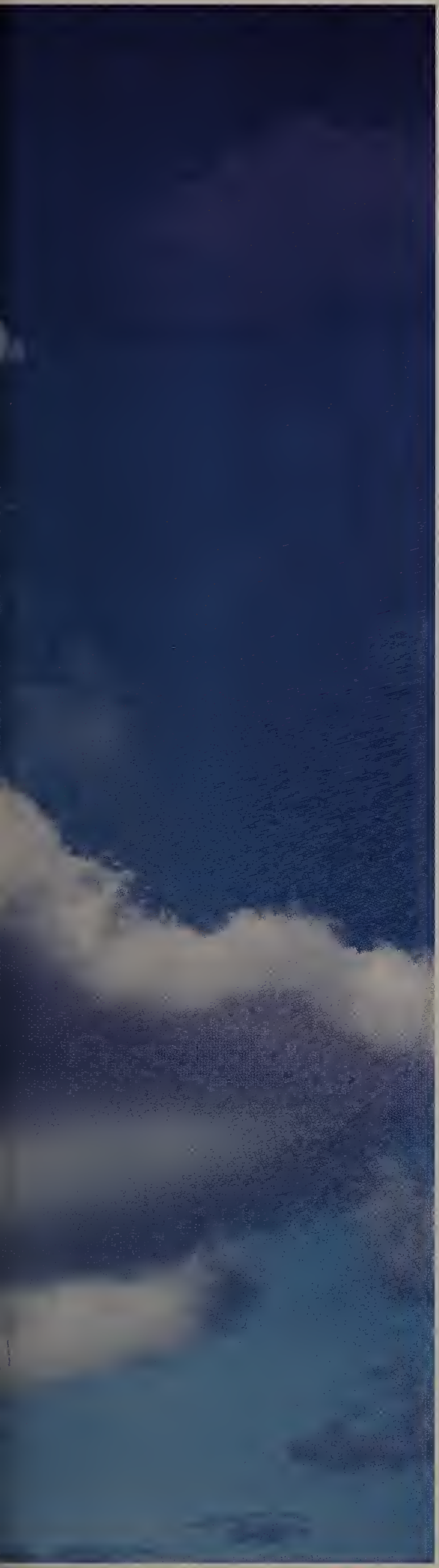

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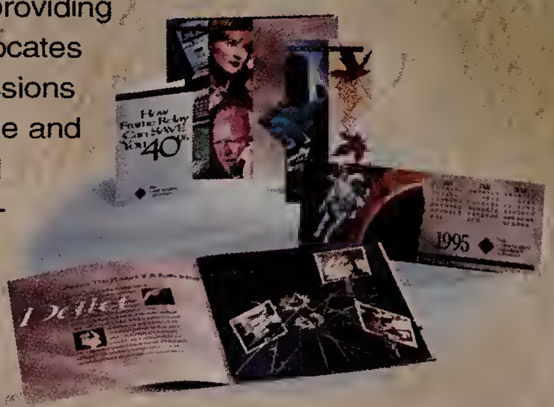

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Video

Continued from page 47

directions: multimedia chips that come bundled on PC motherboards, specialized chipsets that sit on PC expansion boards and software that runs on Pentium-based PCs.

New chips, like the one introduced earlier this month by Texas Instruments, Inc., put the functionality traditionally held in several chips into one and let users conduct videoconferencing over regular telephone lines rather than over sometimes hard-to-find ISDN links.

TI's chips are intended to be bundled onto a PC motherboard. Company officials see TI's TMS320C82 processor as a starting place that will eventually allow the company to combine all the components of videoconferencing into a $35 chip.

"Once you get the cost reduced to $35, it becomes a mainstream, ubiquitous component of a PC," said Rick Rinehard, C8x program manager at TI.

Even with its $82 price tag, the TMS-320C82 chip can be bundled by OEMs into PCs without making much of a dent in the overall system's price, Rinehard said.

And the dial-up telephone line interface is key. AT&T Microelectronics, in fact, already planted the seed for delivering videoconferencing to the masses when it announced in May the AVP-3, which supports videoconferencing over ISDN or regular phone lines. The chip is expected to be available on desktop videoconferencing system plug-in boards by next April.

PictureTel is beta-testing a similar chip, with plans to make it available in December, according to one beta site. PictureTel officials, however, declined to comment.

Intel also has been developing a multimedia-friendly version of the Pentium chip, the P55C.

The processor, initially scheduled for delivery this fall, has been delayed until next year.

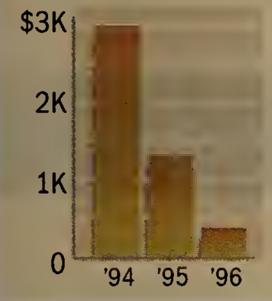
Meanwhile, Intel is also working to cut the expense of videoconferencing with a new software-only version of its ProShare product that will use a PC's CPU to compress and decompress analog information for transmission over WAN links.

Lesser known Vivo Software, Inc. is offering a similar solution.

Gold said that while vendors are going about lowering the cost of videoconferencing their own way, they all face the same challenge.

"The question is, who is going to get it cheap enough and looking good enough to meet market demand next year?" he said. ■

The price for a typical desktop videoconferencing kit is expected to fall below $400 by 1996, according to Elliot Gold of TeleSpan Publishing. The price was around $3,000 just last year, he said.



Oracle

Continued from page 47

Also new to Release 1.2 are cue cards that walk developers through the process of building applications, support for Open Software Foundation, Inc.'s Distributed Computing Environment and links to Novell, Inc.'s Tuxedo transaction-processing manager.

Designer/2000, the company's tool for designing client/server applications, now generates Microsoft Corp. Visual Basic code as well as code for Developer/2000.

On the middleware front, Oracle aired several gateways for accessing Oracle databases from IBM mainframe and Application System/400 front ends. The Oracle Access Managers for IBM CICS, IMS and AS/400 let mainframe 3270 users read and write Oracle data from their desktops via Oracle's SQLNet networking software.

The Oracle Access Manager for CICS is available now, while the IMS version is due by year-end. Both cost $30,000 per mainframe. The AS/400 Access Manager, also expected by year-end, is priced at $25,000 per machine.

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COMMENTS?

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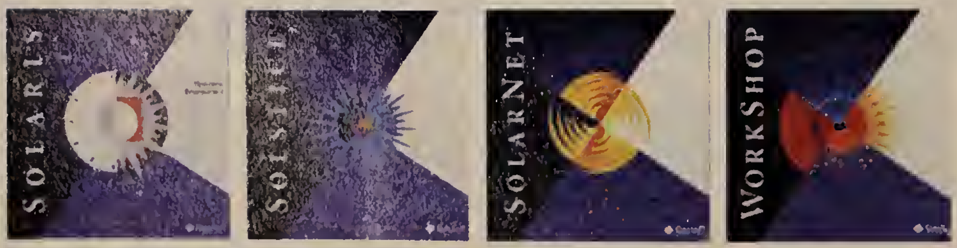

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☐ K-12
☐ Community College
☐ University
Government:
☐ State
☐ Federal Military
☐ Federal Civilian
Commercial:
☐ All Commercial

Which of the following best describes your job function?
☐ Technical Staff
☐ Technical Management
☐ Other________

Do you have a networking project planned?
☐ Within 3 months
☐ 3-6 months
☐ 6-12 months
☐ 12 months +
☐ Nothing planned

What high-performance networking technology do you plan to use within the next 6 months?
☐ FDDI/CDDI
☐ ATM
☐ 100Mb Ethernet
☐ 100VG AnyLAN

How big is your workgroup network?
☐ 10-50 nodes
☐ 51-100 nodes
☐ 101-300 nodes
☐ 301-500 nodes
☐ 501-1000 nodes

What network protocols does your workgroup use/plan to use within the next 6 months?
☐ TCP/IP
☐ IPX
☐ AppleTalk
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☐ Other

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Business Objects, Prism ready revised data warehouse tools

By Barb Cole

Two companies specializing in data warehousing software this week will announce new versions of their tools.

Business Objects, Inc. in Cupertino, Calif., will announce the next edition of its Business Objects query and reporting tool for making on-line analytical processing queries against relational databases. Separately, Sunnyvale, Calif.-based Prism Solutions, Inc. is set to roll out new versions of its Directory Manager and Warehouse Manager packages, which are designed to integrate several types of data in a warehouse.

The Business Objects release, code-named Mercury, includes what the company calls a dynamic microcube engine, a client-based facility that builds a multidimensional view of relational data on-the-fly as users make queries.

Typically, such multidimensional views — which let users examine several attributes of corporate data — are prebuilt and stored in a separate database. With Mercury, however, users can perform multidimensional analysis from their desktops without any changes to the underlying database.

Users also will be able to drill down and create reports based on that multidimensional data.

Corporate information is stored in Mercury's database server-based repository, which lets users interact with the data defined in business terms rather than within an arcane database schema.

Mercury, expected in the first quarter of 1996, also will include a new suite of tools for streamlining the setup, deployment and administration of decision support applications, according to Bernard Liataud, president and chief executive officer of Business Objects.

Analysts said combining the existing query and reporting capabilities of Business Objects' software with multidimensional analysis could prove to be a powerful grouping for end users.

"[Mercury] sounds like it will do some exciting things," said Robert Moran, a senior analyst at Aberdeen Group, Inc., a market research firm in Boston. Doing multidimensional analysis on existing corporate databases from the desktop closely matches "the way that most users want to work," he said.

The tool will run on Windows, Macin-

See **Data warehouse,** *page 61*

Warehousing wares

Product	Pricing	Availability
Business Objects (Mercury)	Not available	Q1 1996
Directory Manager	$60,000 for Unix database version; $75,000 for DB2 edition	This month
Warehouse Manager	$130,000	November

BusinessBriefs

Trecom Business Systems, Inc., an Edison, N.J., systems integrator this week will announce a new service called Cornerstone, which is designed to help Fortune 500 companies **migrate to client/server computing.** Cornerstone is an array of services in four areas: technology planning, application portfolio management, technology reskilling, and systems integration and infrastructure support. Customers can select from a menu of services in each area.

Trecom: (908) 549-4100.

The Open Software Foundation, Inc. in Cambridge, Mass., last week said **James Bell,** director of Open Systems Alliances at Hewlett-Packard Co., has been named as interim president and chief executive officer of the nonprofit consortium that develops distributed computing specifications and software. He fills the vacancy created by the recent, unexpected resignation of **David Tory.** At HP, Bell coordinates the company's strategic relationships and standards activities. Formerly, he has been chairman of X/Open Company, Ltd. and president of the UniForum Association.

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- Discover the infrastructure issues and technology shifts leading to SONET/SDH and fiber/coax/copper/wireless hybrid transport
- Learn the nature of current and developing local loop technologies, as well as their advantages and drawbacks
- Explore the integration of Internet services and applications within your information infrastructure
- Understand the differences between circuit, packet, frame and cell switching
- Develop an informed and meaningful strategy for the transition to broadband networking through SMDS, frame relay and ATM
- Compare and contrast the options for wireless data networking in the LAN, MAN and WAN domains
- Determine the status of video and multimedia communications, for application in a practical business context
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- Develop an informed and meaningful strategy for the deployment of emerging technologies, in the context of effective business applications

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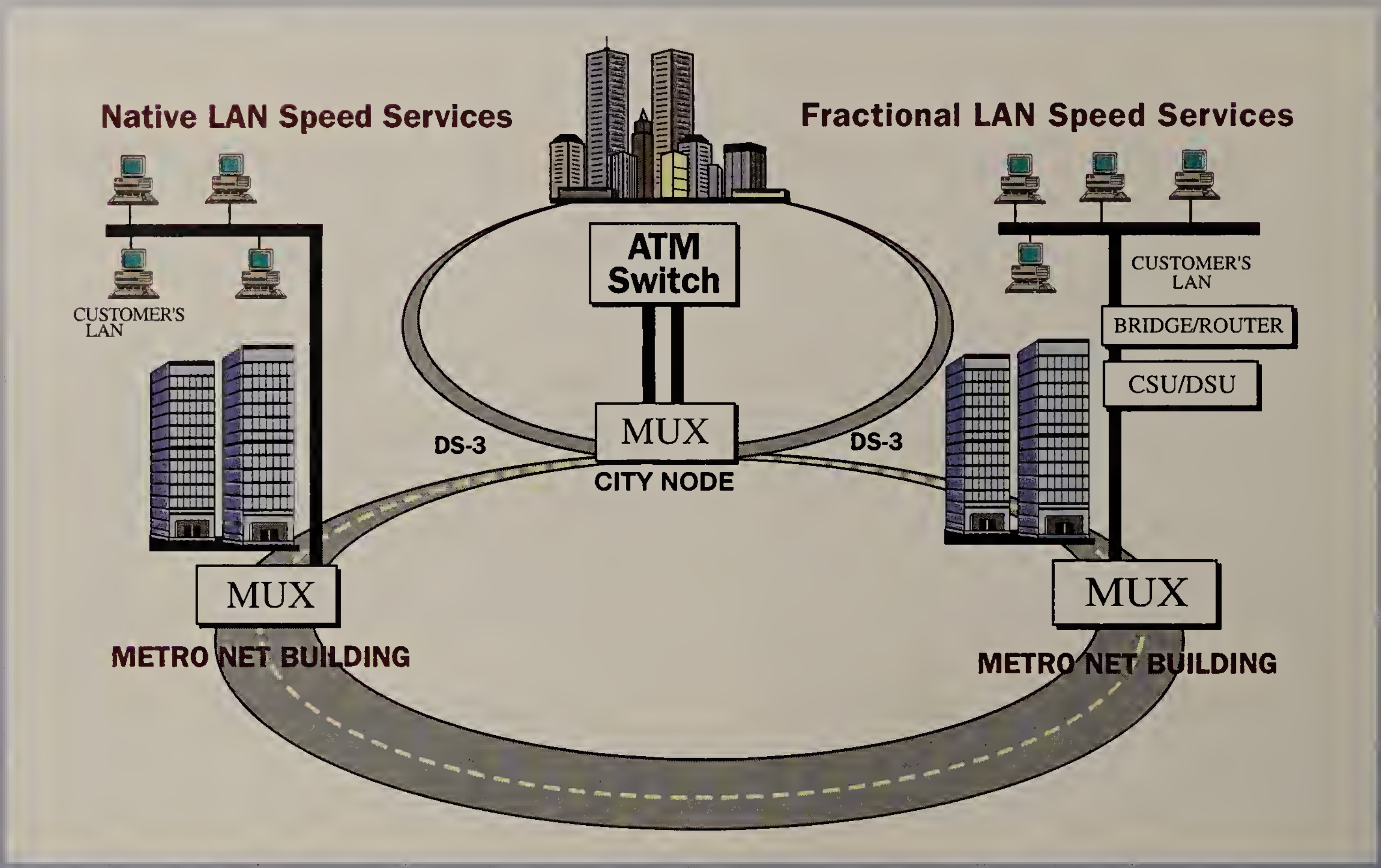

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Circle Reader Service #**59**

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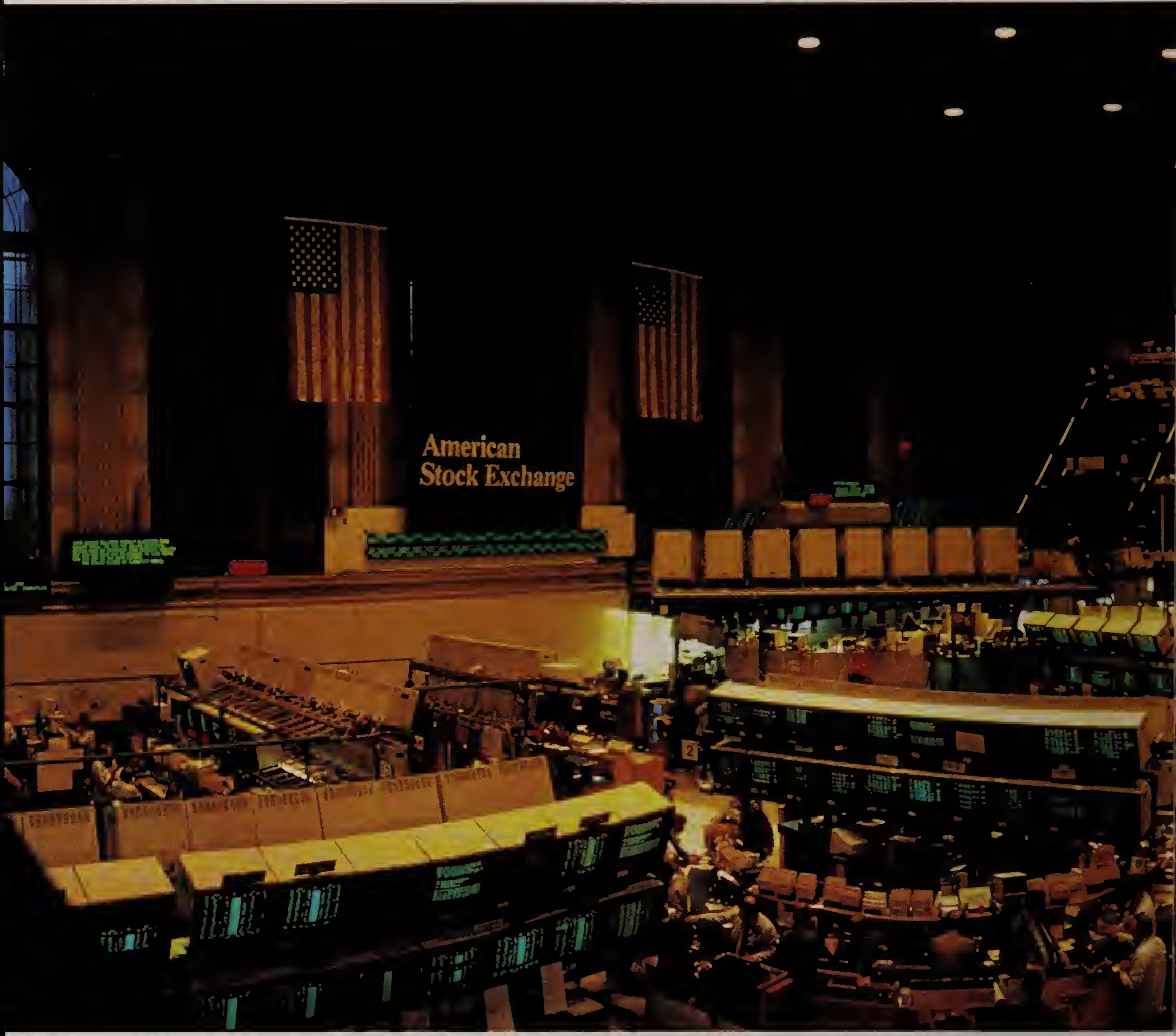
[illegible] H. Armstrong Roberts



The faster broadband networks change, the greater the need to invest in the right technology. Because we're no longer just T3 technology-based, our new company name—OnStream Networks—better represents our expanding line of products.

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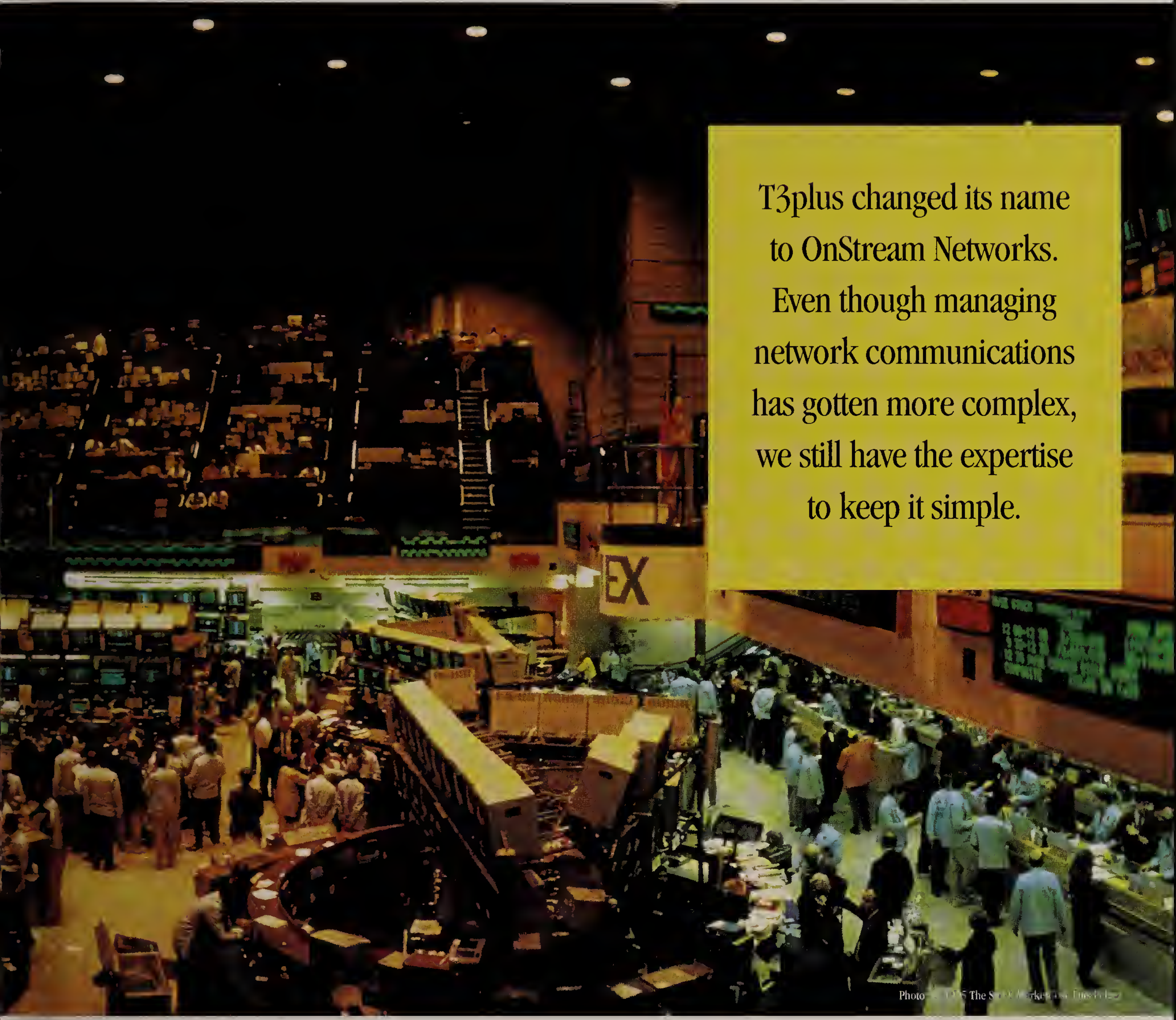

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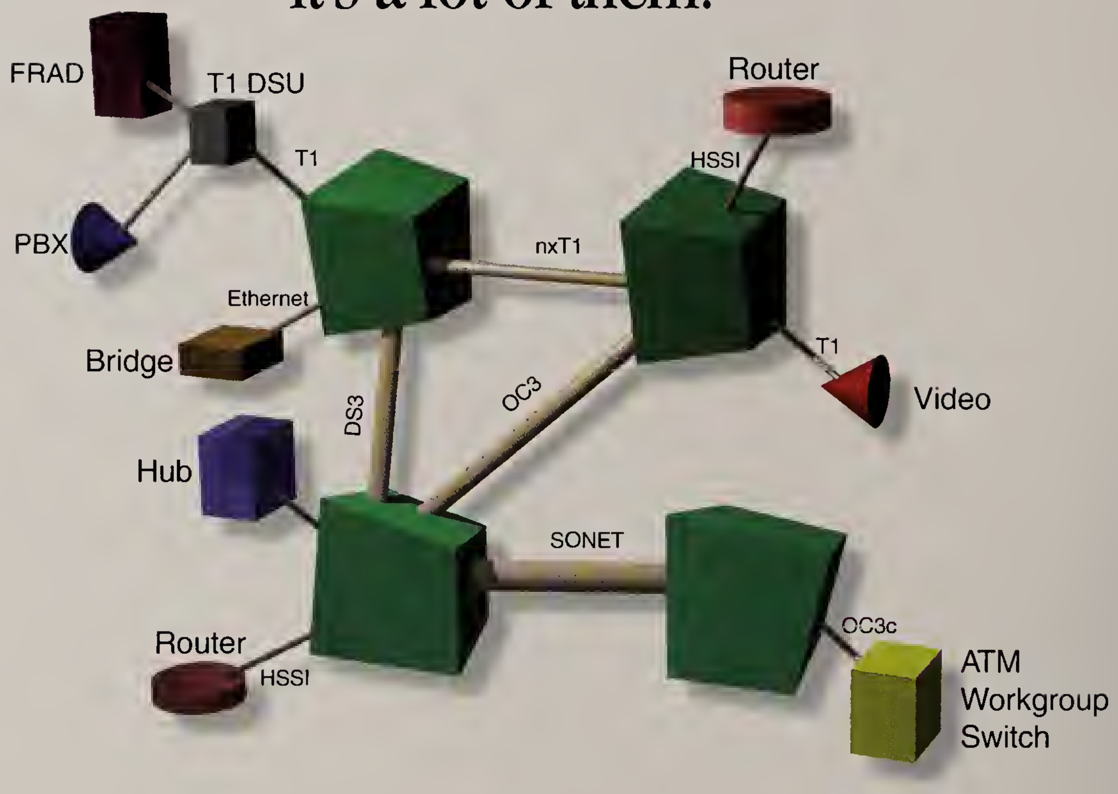

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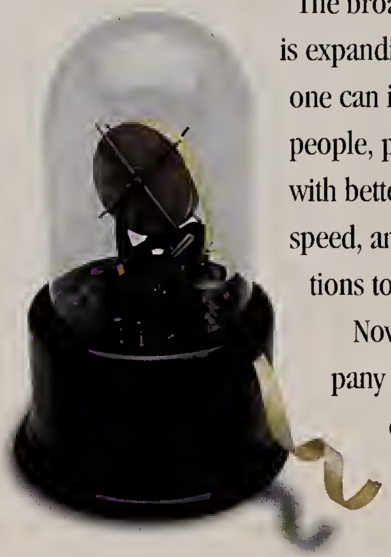

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S20-95

Vhite House encryption plan rapped

y Ellen Messmer

ithersburg, Md.

ftware developers and representatives m the securities and banking industry cently packed an auditorium here to enounce a White House plan for wareousing copies of software encryption ys.

The Clinton administration, conrned that terrorists and other criminals e already exploiting encryption to hide eir deeds from law enforcement, wants e industry to design encryption tools at can only be activated by registering a py of the encryption key with a governent-certified organization.

Mike Nelson, aide to Vice President Al ore, said the plan is completely volunry for the private sector but that federal encies will have to buy these products in e future.

Any products designed to the governent's 64-bit specifications could be ported, a change over the current port rules that restrict software with cryption.

The U.S. government does allow port of some 40-bit software to foreign untries. But a French researcher, using mainframe in a brute force attack on the cryption code in the export version of etscape Communications, Inc.'s World-Wide Web software, showed it was fairly simple to crack this shorter bit-length code.

The Clinton administration hopes that foreign countries will back software key-escrow development in products so that governments can cooperate on catching criminals, while still allowing electronic commerce, dependent on good security, to flourish globally.

At the recent National Institute of Standards and Technology forum where officials from the White House, National Security Agency and the Department of Justice convened to hear feedback about their ideas, the software industry and some users broadly condemned the government's software key-escrow plan.

Users may be interested in escrow to recover lost keys, according to Robert Holleyman, president of the Business Software Alliance (BSA), but the users should select the key-escrow agent, not the government.

The BSA, which spoke for Microsoft Corp., Novell, Inc., Sybase, Inc. and other software vendors, said the administration's proposal could even be interpreted as a strategy that could lead to the mandatory use of key escrow.

Even if key escrow is only an option initially, "it is easy to see how the government could then pursue legislation, making its use mandatory and criminalizing the use of any other encryption," Holleyman said. ■

ata warehouse

ntinued from page 57

sh and Unix clients, and on most relanal databases.

While Mercury is aimed at data wareuse end users, Prism Directory Maner and Warehouse Manager are tarted at warehouse administrators.

Directory Manager blends business d technical metadata into a single formation Directory, which is then used locate and manage warehoused inforation. Metadata refers to information out the source of data and definitions various business terms.

Version 2.0, which will ship next week, n now share metadata housed not just Business Objects' own software, but in ewlett-Packard Co.'s Intelligent Wareouse and Information Advantage, Inc.'s ecisionSuite data warehouses, as well.

Also, the software now supports IBM's B2 and Oracle Corp.'s Oracle7 as server tabases for the Information Directory. eviously, it worked with just Sybase, Inc. tabases. Support for Informix Software, c. OnLine and AT&T Teradata databses is planned for year-end.

Prism Warehouse Manager 4.3, used to ve data from multiple database systems applications into a data warehouse, supports IBM's Application Sys- /400 version of DB2, Teradata datas and SAP A.G. R/3 client/server lications as data sources.

ersion 4.3, due in November, also sup- many-to-many mappings, which let s integrate several data sources in one . New data sources include IMS and databases.

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SHARED LOGIC

Marc Myers

When your databases go mobile

If your corporation has adopted a charter to go with client/server technologies, then part of the transition usually involves a decentralization of information systems. The goal is often expressed in terms of bringing information closer to the customer.

The question is, just how close do you want that end user to get to your data?

With key enabling technologies such as Oracle Corp.'s Oracle in Motion, it is becoming possible to quickly extend the reach of your client/server network to literally anyplace on earth via radio nets.

Essentially, this technology allows a person with a laptop and a specialized transmitter to connect with the corporate database via wireless networks using intelligent agents. Oracle calls this its client-agent-server architecture.

Michael Hogan, vice president of professional services at Tailwind Technologies in Woburn, Mass., is an early provider of Oracle in Motion systems integration services and is enthusiastic about the possibilities opened up by this technology. "Now people can utilize their laptops to their fullest advantage," he said. "When salespersons are equipped with Oracle in Motion, they are armed with what they need to do their jobs and make timely decisions."

Oracle is not the only vendor to enter the mobile data fray; its counterparts are all reaching out to support mobile workers, too. What they have in common is the implementation of store-and-forward technology right on the user's laptop.

The promise of such technology extends far beyond the obvious one of a salesperson who has access to inventory, order entry and electronic mail from any location that can access a satellite. Imagine the uses such technology could have in a military situation where data uploads from remote locations using intelligent agents could enable the immediate processing of gigabytes of strategic information by remote computers.

As companies continue to decentralize, software that ensures remote access to the corporate database with a minimum of hassle will become more compelling.

Now Oracle in Motion requires a good deal of programming on the part of the user. Hogan agreed that the amount of back-end programming on both the client and server end can be significant. However, he said Oracle provides good examples of how to write the code.

The client-agent-server architecture utilizes a gateway on the client side that implements the store-and-forward model. Oracle in Motion has taken this a step further by making the gateway capable of handling packet radio technology, phone-line connections or LAN connections. The gateway also ensures that dropped lines or situations in which users are out of range only create a temporary transmission suspension that can be reengaged exactly where work left off.

On the server side, an agent event manager processes the incoming remote messages and makes them available for custom-built transaction handlers. Oracle will hand you the transaction, but it's up to your code to decide how to get that transaction to the database server and decide what data to return to the remote user.

Ultimately, this technology will make it possible, using replication, to make a virtual client/server net. Database connectivity will be reduced to owning a laptop and a connection to a radio transmitter. But that's when everyone will suddenly scream about data security. So, expect the next set of technologies out of the new mobile database field to include reliable data encryption and trusted data replication.

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726. Myers' column alternates in this space with that of META Group, Inc.'s Mike Rothman.

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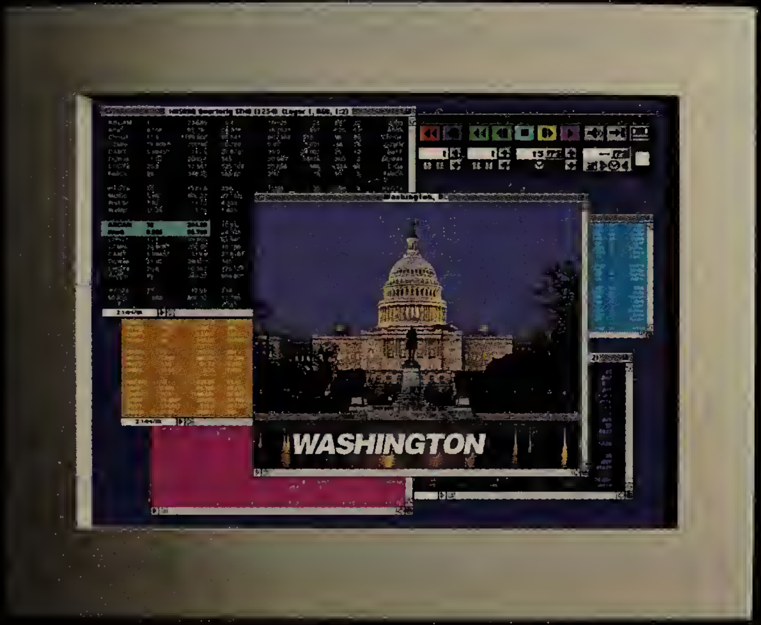

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Electronic Commerce

Covering: Tools and Techniques for Interenterprise Networking and Doing Business On-Line

Briefs

AT&T *is looking to reap the first commercial fruit of its partnership, announced in June, with Internet services company BBN Planet Corp. Later this year or by early next year, the carrier will add* **dedicated Internet access** *to its meager portfolio of 'Net access options.*

The new services, announced last month under the WorldNet Managed Internet Services brand name, run from 56K bit/sec through T-1 and T-3 speeds.

AT&T'S PRICING SCHEME

Access	Cost per month
T-1	$2,600
56K bit/sec	$1,200

The carrier was not specific about other prices.

The Wollongong Group, Inc. *has begun shipping its new Emissary World-Wide Web browser/file manager products.*

The Emissary Desktop Edition, which costs $149, is used for creating and managing **multimedia file attachments.** *It provides LAN-based and dial-up connectivity via Wollongong's TCP/IP stack. Emissary Office Edition, which costs $399, includes the Desktop functionality, plus terminal emulation support for the Digital Equipment Corp. VT, IBM 3270/5250 and Wyse 50/60.*

The Wollongong Group: (415) 962-7100.

Qualix Group, Inc. *this week will introduce an* **Internet firewall** *backup product called SecureWatch for $25,595. The product, based on CheckPoint Software Technologies, Ltd.'s FireWall-1, offers a secondary server to back up the primary firewall server.*

Qualix Group: (415) 572-0200.

Separately, **Checkpoint Software Technologies, Ltd.** *announced its most recent firewall. Version 2.0 includes* **encryption** *capability and IP address translation.*

Checkpoint: (800)429-4391 or at http://www.checkpoint.com.

Treasury Department catches the EDI wave

By Ellen Messmer

Austin, Texas

The U.S. Department of the Treasury, which dispenses billions of dollars each year to businesses for purchases made by federal agencies, is getting ready to pay those bills using EDI.

The Treasury's Financial Management Service (FMS) has installed mainframe-based electronic data interchange software in its Austin Finance Center so it can process federal agency payment requests employing standard X12 820 payment remittance and order technology.

Unlike the current electronic formats used by the Treasury Department, the EDI 820 transaction system will let agencies include a list of the items purchased, making it easier for the government's 14,000 agencies and their suppliers to keep records.

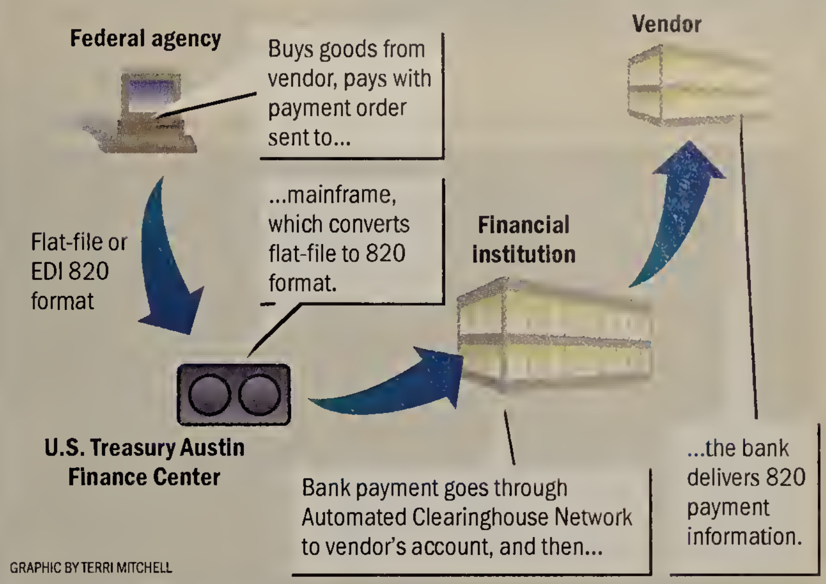
Acting as the bank for most government agencies, except for the Department of Defense, the Treasury's FMS makes about a third of its payments directly to corporate customers' bank accounts. It does so using the financial industry's electronic funds transfer formats over the Automated Clearinghouse Network.

But these formats — such as CCD+ and CTX, along with the proprietary payment format the government uses — do not support lengthy itemization of purchased items. The upshot is that it's often hard for the government and its suppliers to know what a payment is covering.

NetworkWorld Fusion

For more info on this story, point your browser at http://www.nwfusion.com. After you log in, select News+ and then Electronic Commerce.

U.S. TREASURY'S ELECTRONIC COMMERCE ARCHITECTURE


Federal agency
Buys goods from vendor, pays with payment order sent to...
Flat-file or EDI 820 format
...mainframe, which converts flat-file to 820 format.
U.S. Treasury Austin Finance Center
Financial institution
Bank payment goes through Automated Clearinghouse Network to vendor's account, and then...
Vendor
...the bank delivers 820 payment information.

GRAPHIC BY TERRI MITCHELL

The EDI 820 transaction does itemize, and the Treasury's FMS center here is prodding agencies to move to EDI as part of a radical overhaul of the FMS Vendor Express payments program. The government will soon publish a guide explaining how the 820 will be used.

This fall, the National Institute of Standards and Technology is expected to issue FIPS 166-B, which will require agencies to use EDI when applicable in electronic commerce, said Byron Warren, Austin Finance Center's systems manager.

By the Treasury Department's estimates, about 85% of the government's suppliers already employ EDI, while about 1,100 banks can at least handle EDI messages embedded in the CCD+ format. This allows them to credit the corporation's account and then send the EDI message with the itemized list on to the bank customer.

Some still lag behind

Big EDI users, such as Baxter Healthcare Corp. and FedEx, want the government to use an EDI payment system, Warren said, but individual federal agencies still lag behind the private sector in EDI. "Only the Department of Housing and Urban Development is close to being EDI-ready," he said.

Another barrier is that many agency's computerized general ledgers are not set up to do multiple-line accounting to reflect EDI's itemization. "One-half of the federal agencies can't do that," Warren said.

Taking the lead, the FMS Austin Finance Center, which has installed Sterling Software, Inc.'s Victor Connexion software on its mainframe, this month became ready to accept agency 820 EDI messages in the standard X12 3040 version.

For agencies that don't install EDI translation software, the Austin Finance Center will accept agency flat files electronically over the FMS net and convert them into X12 format at the center. Each payment request is encrypted and digitally signed beween the two mainframes. ■

Company explores Internet world with Columbus

By Peggy Watt

Atlanta

Hummingbird Communications, Ltd. is building on its PC-to-Unix integration experience with the announcement at NetWorld+Interop this week of a series of TCP/IP and Network File System applications, including an Internet and intranet access package.

The Ontario-based developer of X Window System products is breaking into a Microsoft Corp. Windows-based environment with the debut of Columbus, an integrated set of Internet access tools and applications that also support LAN operations.

The product's smart interface activates the appropriate applications or file conversions, so the user need not keep track of file or application locations, according to Peter Auditore, Hummingbird marketing director.

"Users can put their Internet tools to work on internal networks," Auditore said. Columbus uses all key Internet protocols but is also designed to support intranet use.

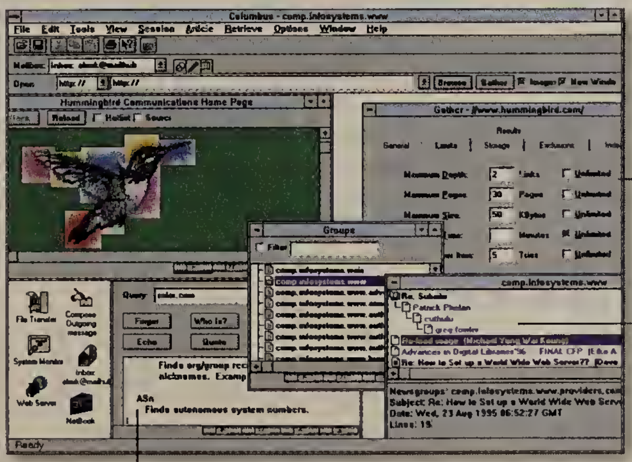
Among the Columbus applications are a World-Wide Web server and browser, gopher, electronic mail, File Transfer Protocol, telnet and a newsreader. The program comes with a TCP/IP stack and Virtual Device Driver functions drawn from other Hummingbird products.

Columbus supports multiple users and has built-in security features such as encrypted logon and system administration controls access to files and applications.

Columbus supports Digital Paper, an electronic document technology from Common Ground Software Inc., to assist document sharing among diverse file formats and enhance Columbus as a collaborative tool.

Columbus for Windows 3.X is scheduled to ship in November; Windows NT and Windows 95 versions will be available before the end of the year. Pricing will be announced upon release.

©Hummingbird: (416) 496-2200.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Gather function retrieves and manages Web documents in multiple formats.

Directory maps local and remote connections.

Several search tools available.

BUSINESS SPACE

Mark Gibbs

No more freelunch.com on the 'Net

I remember it like it was yesterday. There we were, all sitting down to our free domain registration lunch, when out of nowhere, the raving bureaucrats from the InterNIC ripped it away.

The meal was pretty nice while it lasted. As of two weeks ago, for the price of an E-mail message (essentially zero), you could apply for a domain name to be allocated for your use.

I guess Milton Friedman was right after all. "There's no such thing as a free lunch."

It was inevitable. As the 'Net's commercial possibilities became clear, the load on the registration services at the Internet Network Information Center went from a trickle to a flood to a raging torrent. The current turnaround time is 20 to 30 working days, which is an order of magnitude greater than what it was two years ago!

Recently, the InterNIC, which handles naming stuff, has made a big thing about fighting organizations that tried to register multiple domain names. There are two reasons for this: The Domain Name System databases are getting unmanageably huge, and there is a performance penalty that goes along with size.

They also thought that the "one organization, one domain name" rule would stop companies from registering names that they put off using or eventually decided to sell off.

Obviously, there's a compelling reason why companies would want to get the way-cool names before their competition. Who wouldn't want to own web.com, internet.com or computer.com? Or for that matter, how about more generally commercial names like grocer.com or shoes.com?

Now, it will come as no surprise to the more devious amongst you that many companies got around this rule with ease. For example, some registered domains with the domain contact being a different person for each one (themselves, their mother, father, brother, dog, domestic appliance and so on).

However, if you should prowl around the registration database at InterNIC (that's what the WHOIS program is for), you'll notice some very large companies that seem to have bypassed this rule with what must have been InterNIC's blessing.

For example, Procter & Gamble has a total of 97 domains allocated. Count 'em . . . 97!

Not surprisingly, P&G has included many specific brand names in its cache, such as aleve.com, attends.com, camay.com, crestcomplete.com, cresttooth.com, charmin.com, downy.com, duncanhines.com, folgers.com, etc., etc., etc. This is reasonable as we can be sure they'd defend their trade- and salesmarks to the death.

But just check out some of the others they've snagged: antiperspirant.com, babydiaper.com, babydiapers.com, bacteria.com, badbreath.com, beautiful.com, cakemix.com, cavities.com, clean.com, cleans.com, complexion.com, condition.com, conditioner.com, cookingoil.com, and on, and on and on.

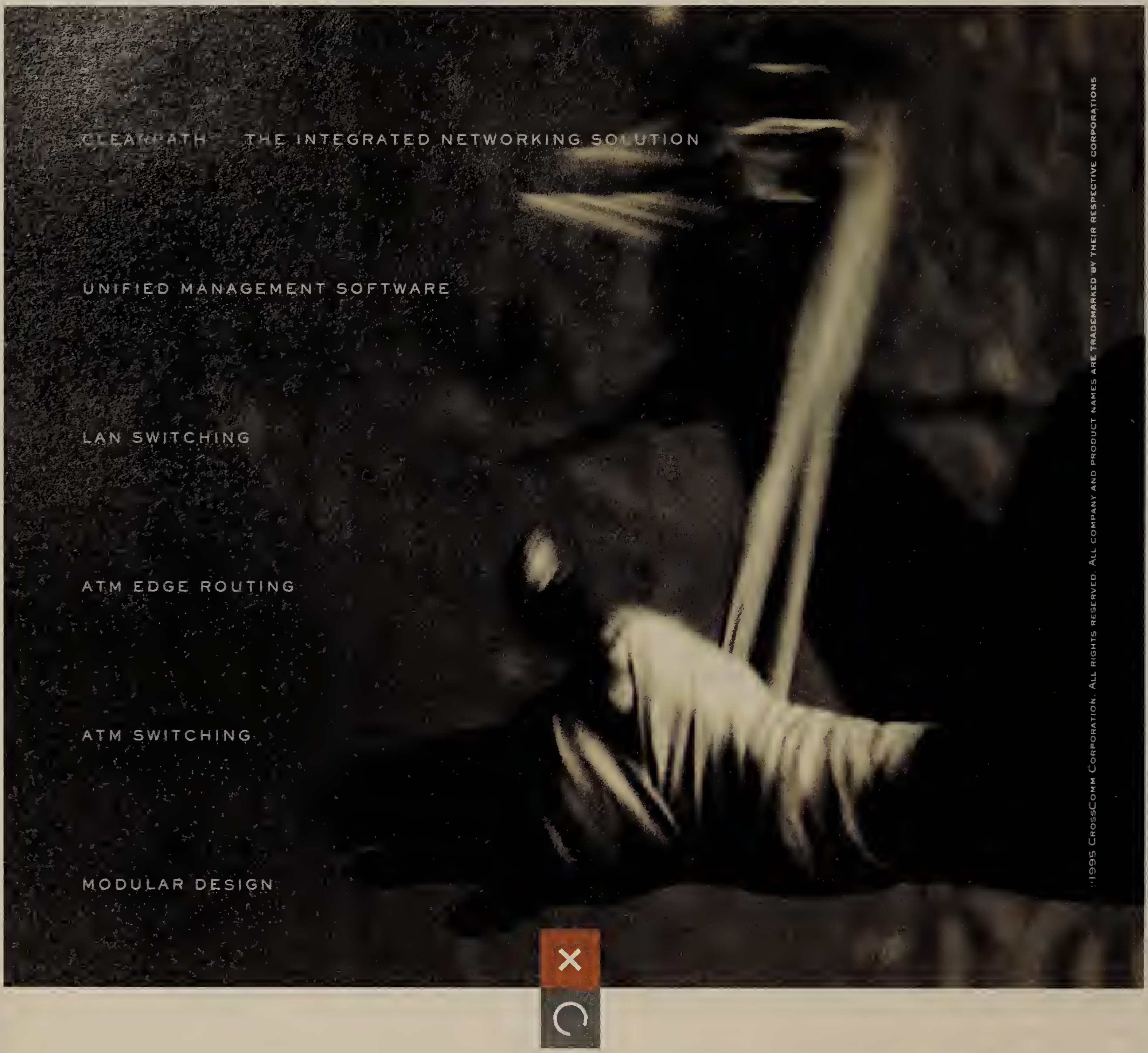
I tried to contact InterNIC about this apparently flagrant breach of their own rules and outright favoritism, but no one was available. Anyone from InterNIC like to explain?

Now, here's where old Milt made his point. As I mentioned, there's no freebie registration anymore. That is, if you want to be in any of the com, org, net, edu and gov domains. As of October 1, the InterNIC is going to charge $100 for registration and $50 per year for maintenance.

Great! It's about time that the whole thing was put on a businesslike footing. It will give the InterNIC a commercial basis, which is what it will need if the 'Net is to become an electronic marketplace.

So, that's the end of the free lunch. But the end of favoritism? We may have to wait for a that a little longer.

Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@gibbs.com.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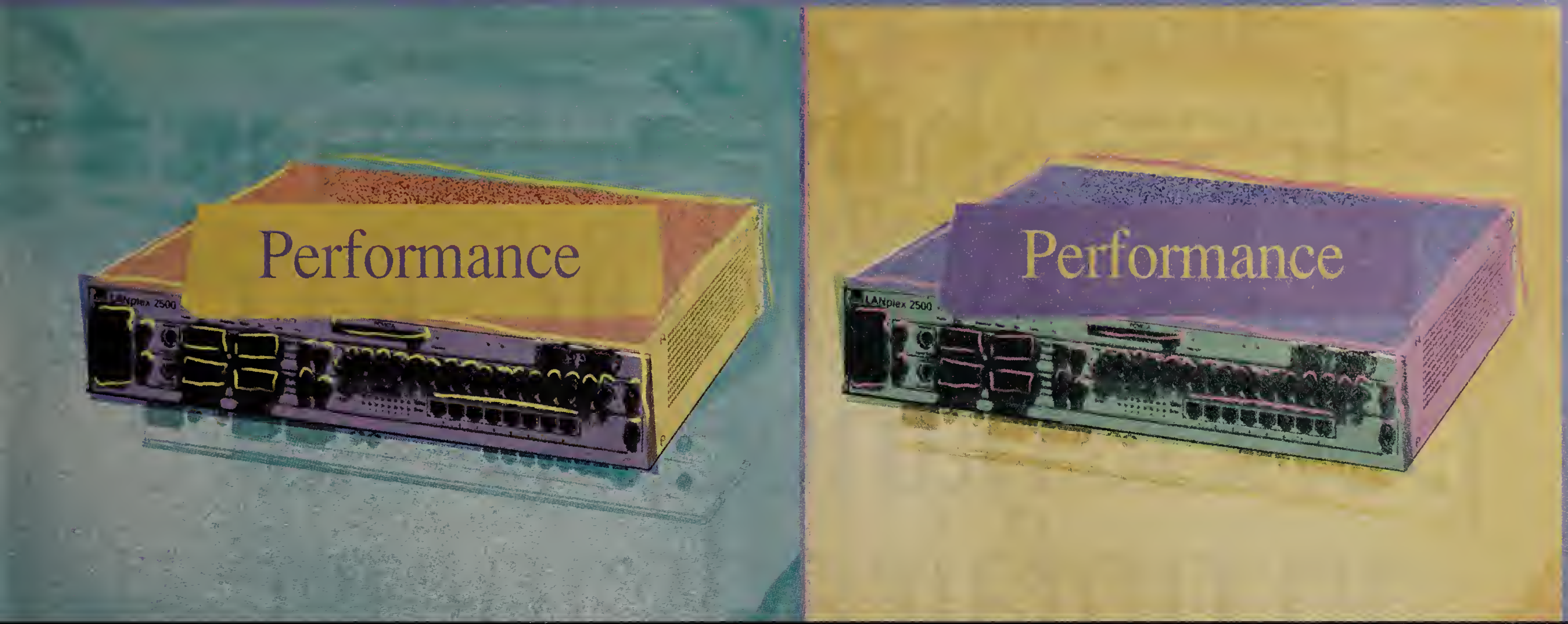

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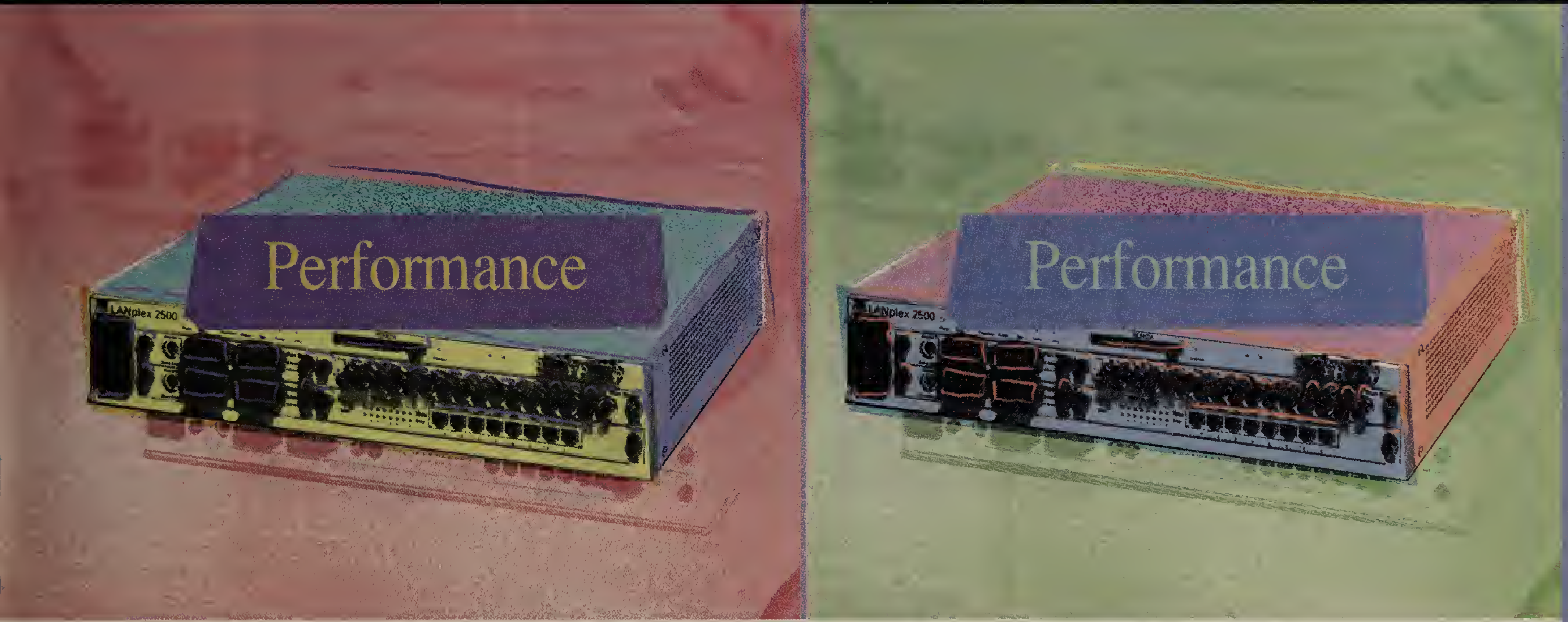

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Performance comparison based on maximum forwarding rate tests with zero packet loss. Tests performed at the Harvard Network Device Test Lab. LANplex 2500 forwarded 562,254 pps in a 1 FDDI-FDDI stream plus 8 Ethernet streams test (2/95). Cisco Catalyst 1200 forwarded 55,026 pps in a 6 stream Ethernet-to-Ethernet via FDDI test (8/94). Price comparison based on list price per switched segment.

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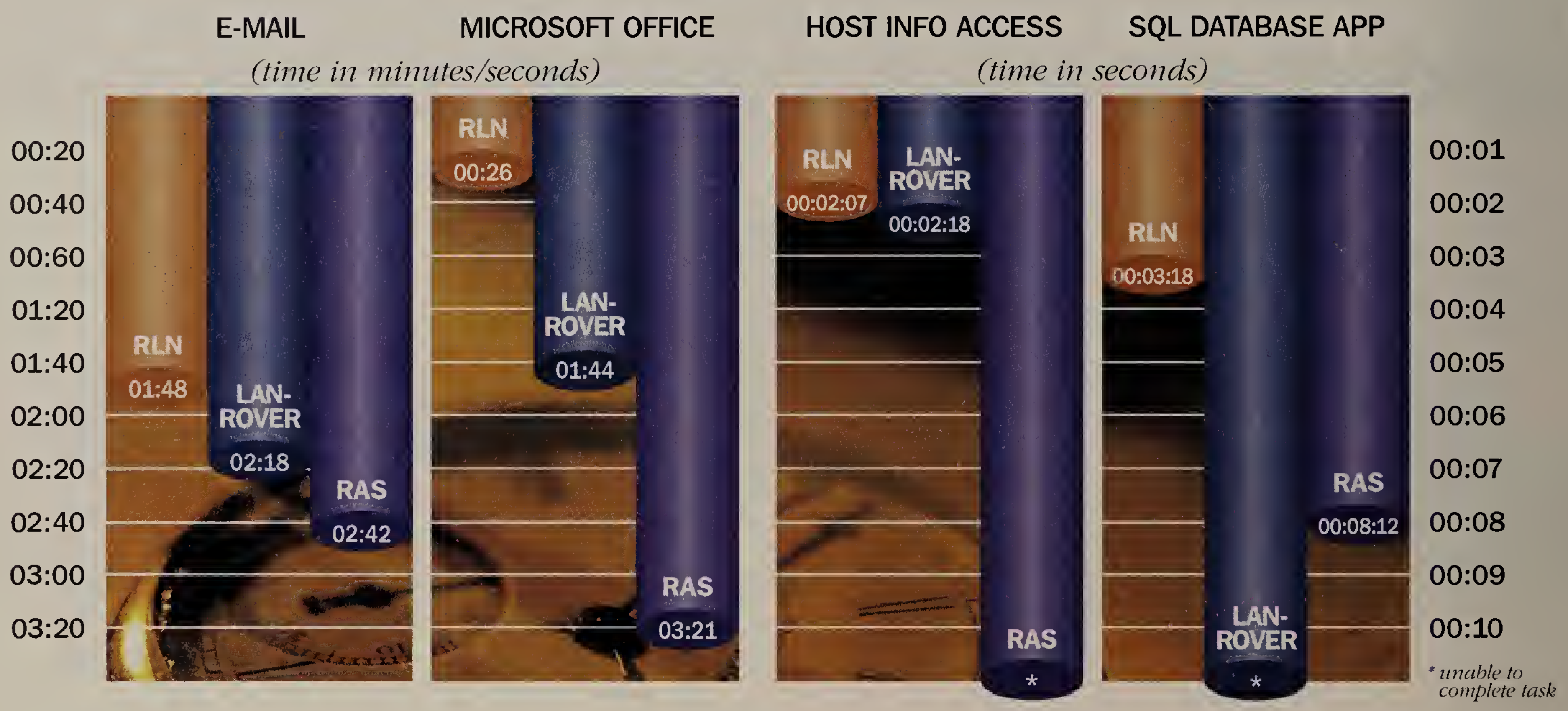

You can have it, too. In a straight up comparison of three leading remote access products, The Tolly Group found RLN® version 4.0 to be across-the-board the fastest performer for four of the most common applications. Tested were Attachmate® RLN, Shiva LanRover™ and Microsoft® RAS.

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Circle Reader Service **#47**

Technology Update

Keeping Up with Network Technologies and Standards

NETWORK HELP DESK

Network World *tracks down answers to your questions. Please submit them to Dana Thorat via phone at (800) 622-1108, via the Internet at djt@world.std.com or via fax at (508) 820-1103.*

What is the 4B:5B encoding scheme that was mentioned in your story "Pumping up 10Base-T with isoEthernet" (Aug. 7, page 33)?
David Esarey, San Diego

The 4B:5B encoding scheme is used in isoEthernet, IEEE's 802.9a isochronous Ethernet, to increase available bandwidth over standard 10Base-T Ethernet cabling for multimedia applications, says Mike Sodergren, director of strategic marketing at National Semiconductor Corp. in Sunnyvale, Calif.

Used primarily because of its efficiency and ease of implementation, 4B:5B yields 16M bit/sec from the same 20-MHz clock that only provides 10M bit/sec on 10Base-T cable.

The 4B:5B encoding scheme transforms data into 5-bit symbols for transmission. These symbols maintain the AC balance of the wiring and minimize the frequency spectrum of the waveforms as they are transmitted. The DC component of the signal varies less than 10% from the nominal center.

Can you help me find a NetWare Loadable Module backup package for Novell, Inc.'s NetWare 3.11 that is compatible with a Conner Peripherals, Inc. Viper 2525 tape drive?
Dell Warmington, Long Island City, N.Y.

Take a look at Palindrome Corp.'s Backup Director 4.0, Cheyenne Software, Inc.'s ARCserve for NetWare, Legato Systems, Inc.'s NetWorker for NetWare and Arcada Software, Inc.'s Backup Exec for NetWare 7.0, which all work in your environment.

For more information, contact Palindrome at (708) 505-3300 or http://www.palindrome.com; Cheyenne at (800) 243-9462 or http://www.cheyenne.com; Legato Systems at (415) 812-6000 or http://www.legato.com; and Arcada Software at (800) 327-2232 or http://www.arcada.com.

For a more complete listing of NetWare backup products, point your Web browser at: http://www.lib.ox.ac.uk/internet/news/faq/archive/archstorage.part2.html.

Defining classifications for Ethernet switches

By Jack Moses

Network administrators are increasingly finding that bandwidth-intensive applications, including video and graphics, electronic mail and large file transfers, are diminishing the performance of corporate LANs, so they are turning in large numbers to Ethernet switches.

An Ethernet switch is a wiring closet device that reduces congestion and improves network performance by segmenting LANs, enabling multiple simultaneous conversations at full wire speed, and filtering packets to reduce network overhead.

Users can buy workgroup, segment, network, backbone, port, enterprise and desktop switches. Each of these products has advantages in some applications and disadvantages in others. To avoid overlaps or mismatches in functionality, Ethernet switches should be classified as desktop, backbone or workgroup devices.

Generally, midsize and large companies will have all three types. Many small and midsize companies will have workgroup and desktop switches only, while the smallest networked organizations may have one or two desktop switches.

Desktop switches

Designed to work well in LAN environments with few or many users, desktop switches are an upgrade or alternative to 10Base-T hubs. They typically have 24 ports, each supporting one 10M bit/sec private Ethernet connection to a single node such as a workstation. In addition, a desktop switch may have one or more high-speed ports that support technologies such as 100Base-T or Fiber Distributed Data Interface for server or backbone connectivity.

By combining Ethernet and 100M bit/sec capabilities, desktop switches minimize blocking when multiple nodes attempt a connection to a single high-speed destination port. For example, multiple 10M bit/sec clients can simultaneously access a single 100M bit/sec attached server.

Desktop switches are easy to install, often containing plug-and-play firmware and simplified setup interfaces for rapid startup.

They are priced as low as $150 per port.

Backbone switches

At the top of the Ethernet switch hierarchy, backbone switches are multiaddress per-port devices interconnecting networks or segments. They connect to 10Base-T hubs, desktop or workgroup switches, as well as servers and routers.

For users who want to increase bandwidth via segmentation, backbone switches are simple, higher performance, cost-effective alternatives to routers or bridges.

They can transfer traffic simultaneously between multiple network segments at full wire speed.

Also, backbone switches can filter packets based on attributes other than destination address. For example, a net administrator could restrict Unix workstations from receiving NetWare broadcasts by filtering packets based on protocol.

Backbone switches are characterized by their large modular design and ability to support as many as several thousand media access control (MAC) addresses. Installation is more complex than it is for a desktop switch, due primarily to the backbone switches' routing capabilities.

Redundant power supplies, hot-swappable modules and Spanning Tree Protocol (STP) support are all mandatory elements of a backbone switch, as is support for emerging switch technologies, including virtual LANs.

When used in conjunction with desktop switches instead of 10Base-T hubs, a backbone switch enables end-to-end switching — thereby avoiding many of the problems of shared bandwidth networks, such as high collision rates, dramatic packet error propagation and reduced security. In its most powerful application, a 100M bit/sec backbone switch can be a high-performance collapsed backbone for 10M/100M bit/sec desktop switches and 100M bit/sec attached centralized servers.

Backbone switches are priced from $750 to $1,500 per port.

Workgroup switches

Workgroup switches are used primarily as a communications channel between isolated desktop switches or 10Base-T hubs and other parts of the network. They combine attributes of their desktop and backbone counterparts.

Like a backbone switch, a workgroup switch can support a large number of Ethernet addresses per port and can replace a router and segment networks or users.

Like a desktop switch, the workgroup switch can support private Ethernet connections to a single user.

While they typically do not include the protocol filtering and other routing functions offered by backbone switches, some workgroup switches support advanced software including STP, Simple Network Management Protocol and virtual LANs.

Workgroup switches can support as many as several thousand MAC addresses per switch with ports used to connect to a small number of hubs or backbones. Given this, workgroup switches must support the STP to simplify network configuration and allow redundant links to the backbone without introducing loops into the network.

A replacement for slower 10Base-T hubs or routers, the key advantage of the workgroup switch is that it lets users migrate from shared to private Ethernet networks by supporting both private and shared 10M bit/sec Ethernet connections. Some workgroup switches offer fault-tolerant features; none provide protocol routing.

Workgroup switches range in price from $250 to $1,000 per port.

UP CLOSE

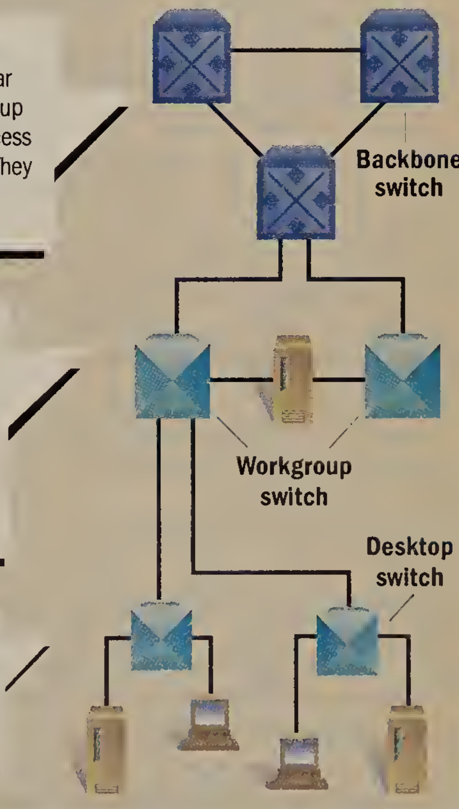
Ethernet switch hierarchy

Depending on their functionality and features, Ethernet switches fall into desktop, workgroup or backbone classifications.

3 Backbone switches are characterized by their modular design and ability to support up to several thousand media access control addresses per switch. They can be used to interconnect networks or LAN segments.

2 Workgroup switches sit between isolated desktop switches or 10Base-T hubs and the rest of the network. They support 10M and 100M bit/sec connections and a large number of addresses per port.

1 Desktop switches typically have 24 10M bit/sec dedicated ports and one or more high-speed ports for server or backbone links.



Dividing Ethernet switches into desktop, backbone and workgroup categories can alleviate user uncertainty about what type to buy.

Users can instead focus on key features, such as price, performance and appropriateness to the application.

Moses is vice president of marketing at Grand Junction Networks, Inc. in Fremont, Calif.

EDITORIAL INSIGHTS

The best of both worlds

Welcome to the new *Network World.*

With this issue and today's launch of Network World Fusion, our World-Wide Web-based service, we've married the best enterprise network information in print with the best resources available on the Internet.

With Network World Fusion (www.nwfusion.com), we've done more than simply put our stories on-line. We've expanded the boundaries of the newsweekly *Network World* by providing a wealth of on-line information and resources that help you learn more about the stories we're covering.

In short, Network World Fusion is a powerful tool to help you do your job better.

For example, Network World Fusion will provide technology primers, white papers, definitions of key network terms, links to important Web sites and other Internet resources, expanded Q&A's, virtual stories and much more.

And you don't have to go scrambling around to find these resources. Key *NW* stories carry pointer boxes directing you to additional information on Network World Fusion, and our Contents page features a new section highlighting information available on-line.

If you've been disappointed by the on-line publications you've seen so far, Network World Fusion will be a real treat. We're not trying to rehash what we already do. Instead, we're building on the strong reporting and analysis we provide in *NW* by leveraging the strength and reach of the Internet.

Along with fresh on-line resources for each issue of *NW,* Network World Fusion also delivers daily news briefs and conferencing tools that will allow you to communicate with colleagues at other companies.

We've created an electronic meeting place where readers can share ideas, insights and opinions with columnists, editors and one another.

Network World Fusion also features a vast reference library (NetRef) that will point you to information on the key technologies you're deploying. You'll find, for example, a wealth of data on broadband networking, E-mail and lots more.

In addition, you can access our archive to search for past stories and columns.

Check out the on-line industry section featuring a stock ticker and special business columns by respected analysts Todd Dagres of Montgomery Securities and Curt Monash of Monash Information Services. The Abend area will point you off to, well, some less serious places on the Internet.

NetworkWorld Fusion

You can read the latest from *NW*'s columnists and slide over to the Career section, designed to help you make the most of your job or find a new one. Network World Fusion also has news about our seminars and conferences, as well as information about *NW*'s advertisers.

The key to Network World Fusion is that it will change daily and weekly. On-line Editor Adam Gaffin will work with *NW*'s reporters and editors to find ways to enrich our news and features with new information, original on-line reporting and direct access to newsmakers.

Gaffin will make sure you always have a compelling reason to access the service.

If you're a subscriber, getting into Network World Fusion takes only a moment or two. (See the instructions on page 5.) Nonsubscribers are also welcome, after completing an on-line registration form.

NW and Network World Fusion will be tightly linked to provide you with the most complete package of information on building and managing enterprise networks. We'll be refining the service each week and your feedback will help us. Drop me or Adam (agaffin@nww.com) a line to let us know what you think.

John Gallant, editor in chief jgallant@nww.com

NETWORK CONVERGENCE

Breaking up is not hard to do, at least not for AT&T

Mary Johnston Turner

Given that I have been a longtime advocate for the business value of computing and communications convergence, you probably expect I was crying in my coffee over last week's announcement of AT&T Breakup No. 2. Nay, gentle reader. I consider it essentially a good thing.

Convergence is about the way businesses use the blending of computing and communications to shorten supply chains, reach new customers, outsource business functions and generally do business faster, cheaper and smarter.

The fact that any one vendor cannot successfully develop, distribute and support products and services across the entire spectrum of computing and communications is not surprising. It speaks directly to the complexity of the current converged environment and the need for each supplier to focus on what it can best contribute to your total solution.

Convergence by definition requires integrated solutions built on optimized components. The push toward product commoditization dictates low-cost manufacturing, sales and distribution models for hardware and software.

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Trying to operate this way in a company structured for solution and service selling spells certain death in the current market. Solution and service selling is more complex, requires longer lead times and involves more sophisticated sales and support.

By creating a separate services company, a telecommunications product company and giving up on computing, AT&T is responding to all the major pressures on IT markets today.

The major pressures include shrinking time to market, the need for product companies to run on very thin margins, the push toward fewer computing platforms, which means only the strong or highly specialized niche players survive, and your need to have it all work together right now.

AT&T, as well as MCI Communications Corp. with its acquisition of SHL Systemhouse, Inc. (announced the same day as Breakup No. 2), has figured out that in a converged communications and computing environment, you will pay better margins on services, including professional integration and outsourced management, than you will for products, the best of which quickly become low-margin commodities. Note that the "new" AT&T has retained the services business, preferring to associate services, rather than products, with its brand name.

AT&T expects the stock market to reward the services company with higher stock valuation based on potential future growth in wireless, multimedia and professional services. It's clear AT&T believes this is where the big money is for the future.

The real question for you is, what happens to my service levels and product support in the short term? And how do I think about my relationship with AT&T in the long run?

In the short term, expect the usual turmoil as AT&T realigns account teams. Things are certain to fall through the cracks for a while as workers try to figure out if they still have jobs, and, in AT&T's highly political climate, which executive they work for.

In the long term, expect the services company to be even more aggressive and AT&T to make a big move into multivendor integration of net and computing products and software.

Expect lots of pitches for systems integration support. Expect AT&T to go through some steep learning curves on what it means to really operate in a multivendor environment where the market dictates which equipment is given top priority.

But the motivation for all the business units that make up the new AT&T services company is clear: As long as it helps push traffic onto the network, AT&T wants to be there. For those of you committed to AT&T's networking products, the future is less predictable. Be ready to look farther afield from Ma Bell with the next RFP. AT&T's PBXs, phones, modems and related premises gear will have to compete on their own in markets known for razor-thin margins.

Now that AT&T no longer has major account sales to rely on, it will consolidate its product lines to trim nonperforming products and use more OEM arrangements to deliver products more quickly and more cheaply. Over time, the yet-unnamed product-focused house is likely to tilt even further toward meeting the needs of AT&T Network Systems' customers, the global service providers.

The big losers in this are Bell Labs and AT&T Global Information Solutions. Bell Labs is being cut into two. The larger part will go with the products company and will have to focus on product development science rather than on pure research. Part of the Labs will survive as a unit supporting the services company, but there is less likely to be room for scientists assigned to think great thoughts.

AT&T GIS gets back its freedom but is rebuilding from a terribly weak position. Expect continued cuts and "refocusing" efforts for some time. It's highly likely that AT&T GIS will eventually be acquired, probably by a transaction host company or a European computing manufacturer.

Despite the difficulties AT&T and its customers face short term, Breakup No. 2 is an excellent decision for those who want and need converged solutions to their business problems. It will pressure the rest of the industry to look at itself and ensure each player is optimized for the business model that makes the most sense for its core business.

You can expect to continue to have lots of folks offering to help solve the convergence challenge for your unique business needs. Building effective, networked computing solutions remains a hard problem, and most of you are still going to need outside help that can move quickly and responsively to get the answer right the first time.

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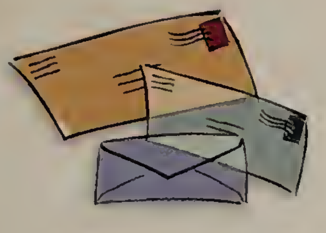

IN-BOX

Cisco delivers to university

I was recently quoted in your article "ATM provides therapy for aching network backbones" (*NW's* "LAN World" demographic edition). I am dismayed at the article's portrayal of the relationship between Cisco Systems, Inc. and Indiana University.

I particularly take issue with the statement "[Indiana University] believed Cisco would deliver on its ATM promises. . . ." The tense of this sentence and the statements in the following paragraph leave the reader with the impression that we are not satisfied with the results of our relationship with Cisco. Nothing is further from the truth.

In fact, Cisco did not miss its ship date. Rather, our window for summer deployment was simply not in sync with Cisco's planned release date. For the record, Cisco has delivered on its promises, and we are now in possession of stable production code for both the Cisco 7000 router and the LS100 switch, and fully expect to deploy these products in our campus backbone in December.

Allen Robel
Principal network planner
Indiana University
Bloomington, Ind.

Poking holes in naming plan

I read David Buerger's article on Internet naming with amusement (Aug. 7, page 59). But I'm not sure about the feasibility of a flat naming space based on products.

First of all, who selects the product category? Suppose my company plans to sell a combination floor wax and toothpaste. This would be a new product, so it deserves a new category.

If the "product lines" are decided by a committee, they still have to deal with all of the unique products, such as ear wax removal systems, fluorescent clothing fasteners using nonmetallic materials and network management systems with software that will work with Windows 95.

How many different products will there be? I think an estimate in the billions would be close, but for argument's sake, let's say it's measured in millions.

Let's look at reality. The domain name system was developed because, otherwise, the host table would be obsolete by the time the file was uploaded. Those who ignore history are doomed to repeat it.

The domain name system is hierarchical. A small number of systems know about each top-level domain and the name servers for each one. Buerger proposes increasing the number of entries by a factor of 10,000 or more.

And finally there is the issue of responsibility. Now that we have one million different products, who maintains these machines providing this information? The vendors? If vendors support the information on locating the competitor's Web pages, can we always trust their responses to be unbiased?

Bruce Barnett
Computer scientist
GE Corporate Research and Development Center
Schenectady, N.Y.

Change medieval domain plan

I think the stated purpose of the new InterNIC policy about domain names (Aug. 14, page 27) is quite reasonable. I can't object to keeping opportunists from grabbing names like kleenex.com and holding them for ransom. The mechanism, however, strikes me as medieval.

I own the rights to my company name in my state by virtue of incorporation. I have never felt the need to have a trademark other than the name itself because I don't have a tangible product to put it on. This should not make me a second-class "netizen." I qualify for a related domain name under the present rules and should be able to keep my domain name without regard to anyone else's later claims.

Domain names and trademarks do have some things in common, but they are not the same. They are both forms of identity, but no amount of policy will make them the same. A little research shows the folly of the announced approach.

My own company name was the natural starting point for me. A cursory inspection of national business telephone listings on a CD-ROM showed 214 listings beginning with the name Presto. Every one of them is using the name legitimately. None of them applied for presto.com before I did.

There are eight national trademarks listed under the single word Presto, and none of them are owned by companies whose names begin with Presto. Probably, if any of these companies were to apply for a domain name, it would be based on the name of their company and not on a trademark.

The policy needs work, particularly the part about suspension of domain names while in dispute. The thought that one's identity could suddenly not exist is the stuff of horror movies.

Responsible administration should lean toward the side of the established use — and of the little guy.

Eric Bear Albrecht
President
Presto Computers, Inc.
Taos, N.M.

Standard support

Mark Gibbs recently raised the point about support for software that users can configure (Aug. 14, page 27). Rather than suggest that configuration be forbidden to users, another alternative is to have a standard set of options, even an entirely standard version of the software or hardware, on which they should test their problem.

One of my consulting clients had a network of more than 1,000 users spread over more than 50 sites around the state and needed to do centralized support. My recommendation was to standardize on hardware and software.

Each support call is predicated on the fact that the support technicians have a standard system that matches exactly the agreed upon specifications. If the user has nonstandard equipment, the first level of support is to have the user try the same thing on the standard equipment. Then it is immediately clear whether the problem is one that the support staff needs to address or a problem with their nonstandard configuration.

The two primary issues with nonstandard configurations, either in hardware or software, are knowing where the problem is and hand-holding users who have a problem specific to their own nonstandard configuration. A support staff needs to distinguish between bugs (or other types of problems they are charged with handling) and user-created problems — if only to set up an appropriate staffing level and fee structure (my idea being that the former are handled free, and the latter are fair game to charge for).

I've seen this plan in action, and it works wonderfully.

Andrew Burt
Consultant and professor
University of Denver

Not good for commerce

In a recent column by Mark Gibbs (Aug. 28, page 45), he wrote, "At the heart of the arguments over whether HTML should be rendition-independent and whether the Web should be 'informational' is simply the facing-off of those who don't want to see a commercial Web against those who do."

In the same issue, I read that the Big Three American auto manufacturers are arguing over whether to use X.400 or Simple Mail Transfer Protocol. Now that sounds like some capitalists trying to impose a standard on one another.

And elsewhere I read about users and pundits denouncing the possibility of there being two standards for the next generation of CD-ROM. Is it socialistic to want a standard and to denounce the vendors for not agreeing to a standard?

When I denounce people who try to extend HyperText Mark-up Language, I'm doing so in the same spirit as the examples above. It isn't good for commerce when Joe Blow can't visit many Web sites because his browser isn't Netscape or Blackbird or whatever. It just leads poor Joe to avoid using the Web, and that's bad for all of us who are interested in selling to Joe.

We don't need government-imposed standards, but we sure could use some jawboning. Next time you see a site so heavily graphic that it takes an eternity to download the images or requires some special browsers, send a nasty message to the Webmaster saying you'll never buy from a company with so little regard for its customers. Or rip them apart publicly in your columns.

Do it for the sake of commerce.

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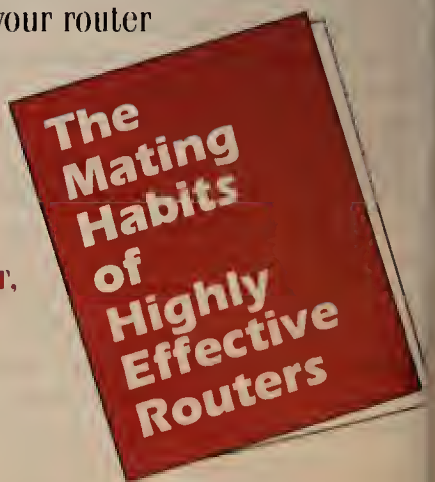

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Circle Reader Service **#55**

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work technicians whose services have been the object of headhunters and corporate bidding wars? The idea seems to run counter to the laws of supply and demand. And yet the results of *Network World's* 1995 Salary Survey show small to negative average salary growth for virtually all network areas and experience levels.

Furthermore, IS and network managers interviewed for this article affirmed that while certain types of networking and client/server expertise are still hard to find, management is no longer willing to pay whatever it takes to get that expertise.

This is particularly true for companies that need to bring in special skills and experience for a specific project, such as a client/server implementation or network reengineering effort. "There is a tremendous trend toward outsourcing," says Gary Gray, managing director of the Quorum Group consultancy in Houston.

"Probably 80% of network support is administrative, and if you have a stable network, you don't need a [networking] superstar," agrees James Del Monte, president of IT staffing services for JDA Professional Services, Inc., a Houston-based consultancy. "So you hire superstar consultants while you are growing, or if you are doing a lot of development."

The 652 IS and network managers who responded to the survey also pointed to a significant drop in the cost of hiring replacements, particularly at the higher seniority levels.

What all of the above points to is an end, or at least a temporary halt, to a golden era for network staffers. A tight job market and widespread corporate downsizing is shifting the balance of power toward the employer. Double-digit salary growth is no longer the norm, and technical skills alone won't guarantee a plush corporate berth.

Conversely, this could be an ideal time for corporations to fill those vacant slots on their networking staffs — provided they can find the right people. Supply is still far from meeting demand in certain hot areas, such as middleware and client/server architectures, consultant and user sources warn. Furthermore, companies that choose not to outsource often end up competing with network systems integrators for the same limited pool of talent, Gray says.

The survey covered five job titles or functions: management, LAN administration, engineering, operations and network applications development. Management was broken down by upper and middle, while the other titles were divvied up according to senior, middle and entry levels (see story, page 76).

Upper management positions reported the biggest drop in salary levels from 1994 to 1995, decreasing 9.9% on average to $95,439. Interestingly enough, this job category was the big winner in the 1994 survey, with salaries raising 26.3% from the previous year (*NW*, Sept. 12, 1994, page 69).

The survey shows middle managers fared only slightly better than upper level managers this year, with their salaries decreasing by 1.3% to $66,976 (see graphic at right).

The complete salary story

Respondents were asked to provide salary and related information for themselves and the various titles reporting to them.

	Average annual salary			New-hire replacement cost		
Position	**1994**	**1995**	**% Change**	**1994**	**1995**	**% Change**
Management:						
Upper	$105,963	$95,439	-9.9%	$100,649	$84,875	-15.7%
Middle	$67,827	$66,976	-1.3%	$62,952	$59,344	-5.7%
LAN:						
Senior	$56,914	$56,333	-1.0%	$54,371	$49,766	-8.5%
Middle	$44,750	$46,194	+3.2%	$42,801	$40,333	-5.8%
Entry	$32,181	$33,451	+3.9%	$31,498	$30,282	-3.9%
Engineering:						
Senior	$66,737	$67,639	+1.4%	$64,494	$59,318	-8.0%
Middle	$52,296	$53,390	+2.1%	$49,985	$46,656	-6.7%
Entry	$35,951	$38,312	+6.6%	$35,032	$34,178	-2.4%
Operations:						
Senior	$53,124	$52,443	-1.3%	$49,151	$46,196	-6.0%
Middle	$40,015	$40,248	+0.6%	$37,134	$35,177	-5.3%
Entry	$27,524	$29,185	+6.0%	$26,472	$26,485	+0.1%
Network application development:						
Senior	$60,938	$60,156	-1.3%	$57,695	$53,713	-6.9%
Middle	$47,645	$48,172	+1.1%	$44,620	$43,398	-2.7%
Entry	$34,252	$35,627	+4.0%	$33,129	$32,045	-3.4%

Mid-level network staffers saw slight salary increases, according to the survey. They ranged from operations, which increased only .6% to $40,248, to LAN administration, which increased 3.2% to $46,194.

Senior staffers also saw slight drops in average salary levels in almost all technical categories this year. Senior LAN administrator salaries dropped 1.0% to $56,333; senior operations and senior network application developers both saw average decreases of 1.3%.

Engineers, the network designers, were the only technical category whose salaries went up at the senior level. But their "raise" was a mere 1.4%, to $67,639.

This is a major departure from last year's survey, in which senior-level networking salaries saw average increases ranging from 8.2% for LAN managers to 13.5% for network application developers.

Furthermore, the cost of hiring replacements saw double-digit decreases almost across the board this year. The biggest drop was in upper management positions, which cost 15.7% less on average to replace this year than last. In the 1994 survey, respondents reported a whopping 39.3% increase in average cost of hiring replacements for upper management positions.

Sign of the times

Behind this year's numbers is a general belt-tightening trend in corporate America, in which salaries are a popular target, consultants say. In the networking sector in particular, a lot of companies are having a reaction against the last few years, when competition for scarce networking expertise put salaries through the roof, users say.

Upper management now has more bargaining power in salary negotiations because a consolidation and downsizing trend has created something of a buyer's market, says Linda Musthaler, vice president of research for Currid & Co., a Houston-based consultancy. "People no longer have to pay big salaries to attract" experienced, technically savvy networking people, she adds.

Corporate consolidation and downsizing has also eroded networking technicians' sense of job security, making them more cautious about jumping ship, says Roger Coates, coordinator of technology management for PanCanadian Petroleum, Ltd., an energy company based in Calgary, Alberta. And that, in turn, is holding down salaries, other users agree.

"We have had very, very low turnover, and people's salaries go up most when they are changing jobs," says Donald Sternfeld, director of IS for the Philadelphia law firm Morgan, Lewis & Bockius. The more recent networking job openings at his company arose when management recognized the need for new personnel, he says, not when someone moved on.

According to the 1995 *NW* survey, 12% of networking personnel got jobs with a new company in the past year. This is actually up 2% from the 1994 survey. However, the overall trend is downward from a few years ago, when turnover rates were in the high teens or even 20% annually, according to one consultant.

Specialists rule

There is still a huge demand for specialized networking expertise, particularly from companies embarking on major projects to reengineer their networks, build corporate messaging systems, or design and implement enterprisewide client/server architectures.

Among the most sought after network professionals are those who have the expertise to build such environments across a hodgepodge of multivendor systems.

"Companies are going multiplatform in their communications, network and operating systems," Del Monte says. "That means whoever can make it all work together is in peak demand."

"Anyone who knows how to design a client/server application architecture, and anyone with internetworking expertise" is hot right now, Musthaler agrees.

"Guys who can get Novell servers going are a dime a dozen; what we are looking for are people who can integrate [access to different types of services] on the desktop," says Robin McCubbin, manager of customer support at a major Canadian retail chain.

"We have Sybase, Oracle, TCP/IP, and now we are getting

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WHERE DO I STAND?

58% of respondents think their compensation was in line with other managers at the same level in their company. Compared with colleagues at other companies, 47% say their salary is about the same, 41% think it is worse, and 12% think it is better.

Title breakdown by salary category

Management

- Upper: CIO, VP, director
- Middle: Network manager, data communications manager, technical support manager, telecommunications manager

LAN Administration

- Senior: LAN manager, project manager
- Middle: LAN administrator, senior analyst, consultant
- Entry: Operator, analyst

Engineering

- Senior: Network architect, engineering manager, consultant
- Middle: Lead designer, senior engineer, senior analyst
- Entry: Designer, engineer, junior analyst

Operations

- Senior: Data center manager, training manager, technical support manager
- Middle: Training specialist, technical support engineer
- Entry: Network operator, help desk operator, technical support specialist, net management specialist

Network application development

- Senior: Development manager, programming manager, project manager
- Middle: Lead programmer, senior systems analyst, database administrator
- Entry: Client/server programmer, systems analyst

Level of education required by job function

Position	High school diploma	Associate's degree	Bachelor's degree	Master's degree	Ph.D.
Management:					
Upper	0.4%	---	48.1%	45.9%	5.6%
Middle	2.4%	4.5%	71.4%	20.2%	1.4%
LAN:					
Senior	4.4%	7.4%	71.9%	15.2%	0.4%
Middle	8.4%	21.3%	65.5%	3.8%	—
Entry	19.4%	30.6%	46.4%	2.0%	—
Engineering:					
Senior	—	2.4%	53.4%	39.9%	4.3%
Middle	1.9%	8.5%	75.5%	13.7%	—
Entry	5.6%	12.2%	77.0%	4.1%	—
Operations:					
Senior	14.3%	13.9%	59.2%	11.7%	0.9%
Middle	22.2%	30.9%	41.3%	5.7%	—
Entry	41.2%	30.8%	26.7%	1.4%	—
Network application development:					
Senior	3.6%	5.9%	70.1%	17.6%	2.3%
Middle	5.3%	11.9%	74.3%	7.1%	0.9%
Entry	10.8%	23.8%	62.3%	2.2%	0.4%

Example: 48% of the respondents indicate a bachelor's degree is the level of education required for an upper management position.

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Win95," McCubbin says. "Integration of the software across all of these is a fair bit of work."

Playing the outsourcing card

The big difference as compared to several years ago, sources say, is that management is increasingly hiring the skills it needs on a contractual basis, rather than making a permanent staff addition.

Outsourcing can mean big cost savings because it provides management with "the ability to deal with a variable cost on an as-needed basis, instead of fixed costs all year around," Quorum Group's Gray says.

This is particularly true for "projects that demand different types of talent and different numbers at different times," such as the building of enterprise networking backbones and messaging systems, he adds.

Hill, Stedman & Simpson, for example, hired a consulting firm during a PC LAN implementation "to save money over hiring and training staff," says Jeff Reiter, manager of IS for the Chicago law firm. He estimates that outsourcing saved his company the need to hire "an extra body at $50,000 to $80,000 a year."

PanCanadian takes care to hire consultants not only to build, design or reengineer a system, but also to pass on their knowledge so that in-house networking people can run and maintain the system after they leave, Coates says. "You want them to show, not just do."

Budgeting for this type of strategy can be tricky, Coates warns. "The time frame for achieving things is the speed at which [in-house] people can learn, not how fast the consultant can do it. So you have a high-priced consultant around for longer than if you just focus on tangible results," he says.

"We do a lot of outsourcing to keep headcount down," says Joel Levy, director of IT for Pfizer, Inc.'s legal division. "If we are rapidly growing one year but not the next, or if a project is over, we don't have to worry" about benefits and headcount outlays that are no longer justified, he adds.

Some areas do not fit well with the outsourcing scenario even though they require high levels of expertise.

One such area is network management and analysis, according to Ken Moerman, a network services manager at First Security Information Technology, Inc. in Salt Lake City. "We don't want to turn over [the network] to outsiders," he explains.

And yet, "People are putting in [new networking devices and technologies] so fast, we can't keep a handle on it," Moerman says, noting expertise to manage these increasingly complex networks is still scarce enough to foster bidding wars.

The solution to that problem, as practiced by First Security and other savvy companies, is "augmentation: getting the network vendors to come in and play an active role in helping in-house people manage the networks," Moerman says. Firms including 3Com Corp., IBM and such regional Bell operating companies as US WEST are all offering these type of services, which he says fall short of "a telnet connection that lets a vendor actually configure routers."

What augmentation often does entail is having a vendor monitor the network over in-house managers' shoulders, working with other vendors to troubleshoot problems "without finger-pointing" and configuring management utilities such as Simple Network Management Protocol traps, Moerman says.

Entry-level boom

Bringing in experts to train inexperienced in-house staff is one likely reason the 1995 *NW* survey found the biggest salary increase in entry-level positions. Entry-level engineering saw a 6.6% increase, entry-level operations 6.0%, network application development 4.0%, and LAN administration 3.9%.

"If you look at the market as a pyramid, 60% of the demand is for entry-level positions; 30% for mid-level technical people, the first-line supervisors; and 10% for upper level people," Del Monte says. "As you get more experience, need for your skills becomes less. How many network engineers do you need once your LAN is up?"

Indeed, savvy corporations are trying to minimize the need for experienced analysts and engineers by pushing routine tasks as far down the seniority level as possible. Increasingly user-friendly and automated network management tools are helping.

"We're wrestling with how to proceduralize as much as possible; that is, which events can you train an operator to handle vs. events that require an analyst to diagnose the issues," PanCanadian's Coates says. "We want to evolve to where a senior operations person defines procedures then trains the rest."

One advantage the oil company hopes to garner from this strategy is having computer operations people handle the overnight shift instead of network operations, Coates says. "So we won't have to hire network people just for the graveyard shift."

Companies are also keeping salaries down by making career development a part of compensation, Musthaler says.

A growing trend is to "encourage employees to take courses in business as well as technical areas to make them more well-rounded," she says.

Increasingly, too, such programs are offered less as perks than as prerequisites for future job growth and security.

One upper level IS manager says he now expects his operations people to be able to talk intelligibly to business users about their networking needs "and not be just backroom geeks."

Sternfeld, of Morgan, Lewis & Bockius, echoed those sentiments.

"Four years ago, I hired a LAN administrator who was technically proficient," he explains. "Now I say, 'technical expertise is not enough; we need someone who also understands business applications and the user perspective.'"

As in any period of profound change, those who cleave to traditional ways are in danger of becoming obsolete.

Middle IS managers, for example, are being expected to redefine their jobs away from "traditional planning, budgeting and human resource development duties," according to Gray. "Now they are learning to be the team leaders, the facilitators."

Those who can't make that leap "will fall by the wayside" as their traditional jobs are phased out, he says.

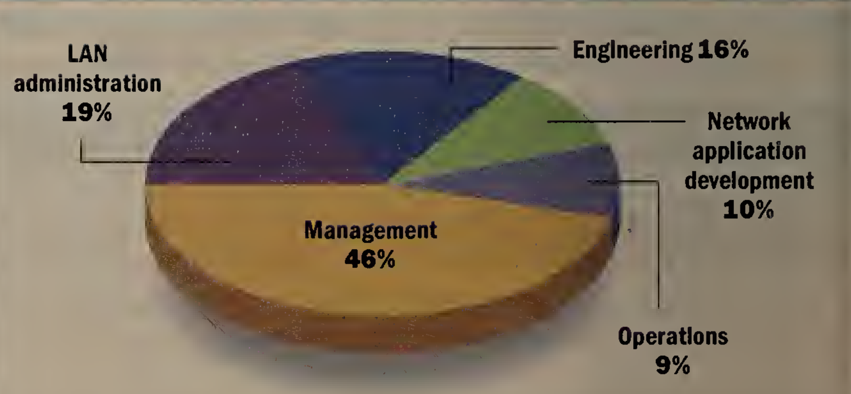
A word to the wise.

Horwitt is a freelance writer based in Waban, Mass. She can be reached via CompuServe at 75244,1666.

MOVING ON UP

Approximately one-third of the respondents say they have either changed jobs with their company (22%) or changed companies (12%) in the last 12 months. The reasons given most frequently for changing jobs were to gain additional responsibility (39%), increase compensation (38%) and learn new skills (24%).

Survey respondents' job function



Survey methodology

The 1995 Salary Survey was based on 652 responses from a randomly selected sample of the publication's subscribers who manage their companies' networks.

To ensure that the sampling accurately reflected the U.S. networking population, company sites were chosen from a breadth of industries.

Only subscribers who specify, recommend or approve purchases of $1 million or more annually in network equipment and services were invited to participate.

The survey requested respondents to provide salary and related information for themselves as well as the various titles that report to them. Information was collected using a four-page questionnaire, which was mailed June 9.

Under the direction of *NW* Research Director Anne MacKay, answers from the returned questionnaires were compiled into a database. The data was then averaged and cross-tabulated by vertical industry and geographic region.

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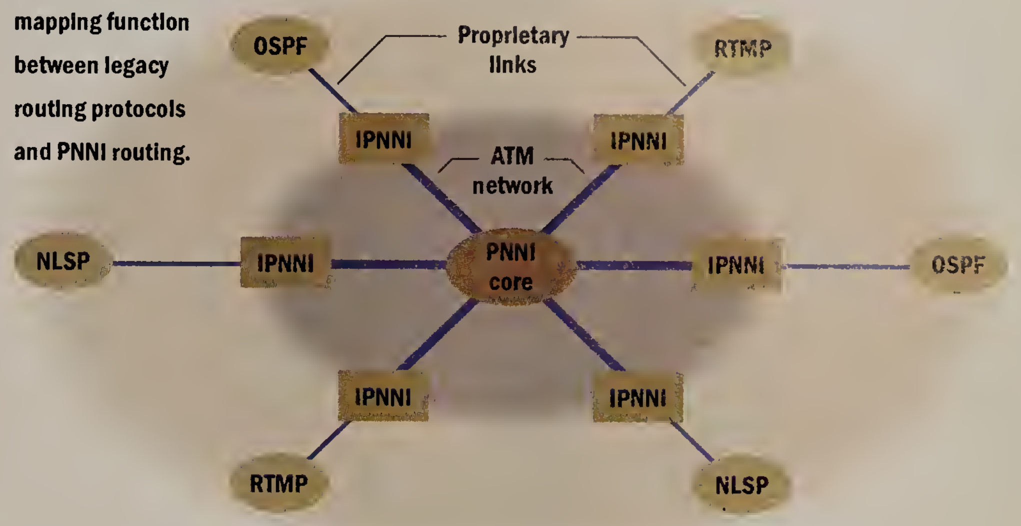
Checking the routing structure of the switching blueprints

INTEGRATED PNNI ROUTING MODEL

Figure 1

IPNNI defines a mapping function between legacy routing protocols and PNNI routing.



NLSP = NetWare Link State Protocol

RTMP = Routing Table Maintenance Protocol

By Charles Bruno

BaySIS, CiscoFusion and other grand switching plans lay a course for ATM, but their routing schemes set them apart.

Bear, Stearns & Company, Inc. is on the leading edge with ATM, already using it to anchor stock-trading backbones in New York and London. At this juncture, the firm is anxiously waiting for Bay Networks, Inc. to deliver features and functionality promised in its Bay Switched Internetwork Services (BaySIS) architecture.

Don Henderson, vice president of engineering, says Bear, Stearns likes Bay Networks' customized private network-to-network interface version — called Integrated Private Network-to-Network Interface (IPNNI) — for supporting routing alongside switching.

"IPNNI will address multiple concerns for ensuring interoperability between Bay Networks' and other switches," Henderson says. "That's important for integrating Bay gear with wide-area switches and 25M bit/sec ATM equipment."

For Bear, Stearns, the BaySIS decision may have been straightforward — the firm used Wellfleet Communications, Inc. routers and SynOptics Communications, Inc. hubs before the two firms merged. But the architecture issue isn't that clear-cut for all.

John Scoggin, supervisor of net operations at Delmarva Power & Light, Inc., may be migrating the company's backbone network to Cisco Systems, Inc. routers, but that doesn't mean he is sold on the vendor's CiscoFusion switched internetwork architecture.

"The common wisdom has been not to mix routers from various vendors, and the same philosophy needs to be extended to switches."

David Passmore

On the contrary, the Newark, Del., utility is rolling out three Cabletron Systems, Inc. Multi Media Access Center (MMAC) Plus hubs to key sites and Cabletron Ethernet switches across its enterprise net.

"It all fits together very nicely," Scoggin says, adding that he may eventually buy into Cabletron's Synthesis switched internetwork architecture.

"We're looking for solutions that are a software upgrade or a board swap into an existing hub or other device," he says. "We don't like the idea of dumping another box on the network and having to support it."

Whatever your case may be, one thing is clear: You have some decisions to make as you blend traditional routing and newer switching technologies into a cohesive architectural framework that shares common management services.

"Net execs be watching these architectural developments closely because they're going to get married to one," warns David Passmore, president of Decisys, Inc., a Herndon, Va., consultancy. "The common wisdom has been not to mix routers from various vendors, and the same philosophy needs to be extended to switches, as well."

But to understand the morass of "marketectures" that have swept the industry, you'll first have to comprehend the philosophical differences between strategies from Cisco and Bay Networks, and, to a lesser extent, IBM, Newbridge Networks, Inc., 3Com Corp. and Cabletron Systems, Inc.

Essence of mainframe

CiscoFusion is Cisco's master blueprint for bringing LAN switching into the wiring closet

Continued on page 80

Continued from page 79

and Asynchronous Transfer Mode switching and routing onto the enterprise backbone.

The firm makes no bones about its decision to support multiple routing protocols atop an ATM backbone in what amounts to an overlay strategy. In essence, Cisco uses the ATM fabric as a high-speed transport for different traffic types. So you could layer an OSPF subnet on top of the backbone, along with a RIP-based subnet and APPN data, providing each with a separate channel for routing topology and update information.

Thomas Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy, isn't crazy about that idea. "That means you may have three to four protocols all developing their own view of the network topology, even though the elements are the same," he says. "It makes for a messy environment."

"We can deliver the type of routing needed at the network layer by defining parameters via QoS."

Brian Brown

"My friends down the street at Bay have a vision to glom all that together onto a single multiprotocol pipe, but that's a long road to hoe," counters Larry Lang, Cisco's director of product marketing.

Essentially, the Cisco model for implementing routing in a switched environment is nothing more than an exploded router, where certain core functions remain highly centralized while relay tasks are distributed closer to the edge of the network.

In that sense, CiscoFusion parallels the mainframe-centric model of networking. Route calculation intelligence is centralized into a device called a route server that may service thousands of nodes. In extremely large networks, there could be several route servers performing load balancing and backup across the network — although Cisco says users have not yet put this theory into practice.

The route server calculates the best path for data to traverse and issues status updates to edge devices, which Cisco refers to as multilayer switches. These devices filter and forward routed data based on calculations made by the route servers.

"Fusion does a wonderful job of extending the router paradigm into the ATM future," Nolle says. "But it doesn't address how to exploit ATM."

Management monkey

But there is a cost for adopting the route server strategy, according to analysts. Cisco must reinvent network management and pull together all its management products. And there are no standards or tried-and-true management mechanisms for a route server environment.

One interesting technique Cisco has devised is to adopt the IEEE 802.10 frame-tagging standard for marking virtual LAN frames that move among physical LAN segments to their recipients on logical subnets.

"Not only can you communicate to other switching gear, but you can identify frames for servers, too," Lang says.

Cisco also makes it clear that while it offers ATM adapters for some workstations, the firm believes ATM's real home is in the backbone.

"It will be some years before ATM succeeds at the desktop," Lang says. "But it definitely works up to the wiring closet where switched 10M, switched 16M and switched 100M bit/sec nets take over."

But analyst Nolle disagrees. "That's one of the fundamental mistakes these guys are making," he says, adding that Cisco has been reluctant to embrace even 25M bit/sec ATM to the desktop for fear of exposing "the dualism of CiscoFusion."

He added: "Today, if you kiss off one cheek, the Cisco gear looks like a router, and if you kiss off the other, it looks like an ATM switch. If you put ATM all the way to the desktop, users may wonder why they need routing at all."

Moreover, Cisco seems to misunderstand how important ATM is to users like Coyne Gibson, information technology manager at Convex Computer Corp. in Richardson, Texas.

"If you look at microprocessor and workstation technology, we're taking a 500 MIPS [Reduced Instruction Set Computing] chip and planting that in a workstation. The sole bottleneck is the wire that connects that machine to the network. That's why we need ATM," Gibson says.

Can't get enough?

There's lots more information on the World-Wide Web on this topic, all of which can be easily reached via Network World Fusion, our new on-line service.

Among the better ones is a site run by the Naval Research Laboratory that includes **information on ATM research projects,** updates on **ATM standards,** as well as hot links to data on IP over ATM, ATM hardware and connections to ATM test beds.

We'll also hook you up with contacts at universities and companies that are pioneering the use of ATM and **virtual LANs**. Additionally, there's more information from analysts quoted in the accompanying story, including those at Strategic Networks Consulting, Inc. and CIMI Corp.

Finally, you can get more data from the horse's mouth, so to speak, through **hot links** to Bay Networks, Inc.'s BaySIS page and Cisco Systems, Inc.'s on-line information service.

To reach Network World Fusion, point your Web browser at http://www.nwfusion.com. After you log on, select NetRef from the main menu and then ATM.

Network World Fusion

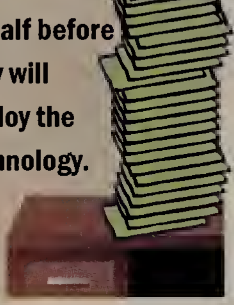
Bay Networks is likewise quick to point out the inefficiencies of the overlay routing approach by archrival Cisco.

CiscoFusion requires as many as four protocols to pass routing instructions, says Brian Brown, Bay Networks' director of product management for Advanced Systems Software.

Under the plan, an edge device — or multilayer switch, in Cisco parlance — must query a route server.

Since the multilayer switch does not support the PNNI standard developed by the ATM Forum, it uses IGRP or another router protocol to initiate contact with the route server. Then, the multilayer switch uses the Next Hop Resolution Protocol (NHRP) to ask for a route. If one route server must check with another across the enterprise, it invokes the Route Distribution Protocol to communicate.

ATM deployment is directly related to the cost per desktop – currently about $2,500. Users say that number must come down by half before they will deploy the technology.



"That's pretty inefficient in our view," Brown says. "NHRP doesn't even have quality-of-service parameters." That means there's no cost information for links in the ATM net, and you cannot specify latency, cell delay or bandwidth. "If you don't have a protocol that does this, you're not going to be able to determine optimal routes for data."

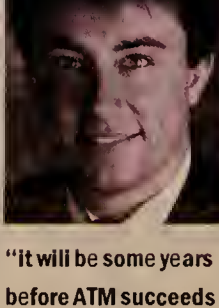
Adds Stephen Collins, Bay Networks' director of product marketing, "When you've got that many protocols working independently of each other, they discover link failures independently and must converge on their own new topologies. It makes for an interesting delay."

Despite what detractors say, Cisco has the most market muscle in the field and may influence other vendors to throw their support behind CiscoFusion.

"One of the biggest issues vendors must face is having to jump through interoperability hoops with Cisco," adds John Morency, an analyst with The Registry, a Waltham, Mass., consultancy. "With the frame-tagging approach that Cisco is pushing, there may be some basis for third parties to support CiscoFusion because it's in their interest to advertise compatibility with Cisco gear."

Spreading the smarts

While CiscoFusion spells out a plan for threading together switching, routing and ATM services with legacy LANs, BaySIS takes a broader view.



"It will be some years before ATM succeeds at the desktop."

Larry Lang

Like CiscoFusion, BaySIS maps out the transport issues relating to switched internetworks, but it goes further by defining an entire set of administration functions and policies for those nets.

"Bay is probably the furthest vendor along in support of RMON and RMON II," says Nick Lippis, president of Strategic Networks Consulting, Inc., a Rockland, Mass., consultancy. "That's the enabling technology to implement policies and central control over a distributed type of net architecture."

And when you zero in on the differences in the way Cisco and Bay Networks handle switching and routing, you begin to see diametrically opposed ideas.

Where CiscoFusion centralizes the routing decision making, BaySIS calls for distributing routing smarts into LAN switches on the edge of the net. Essentially, every switch also houses a router. This distributed approach will let LAN switches communicate with ATM switches to exchange routing topology information and send routing updates to other switches.

In that sense, BaySIS represents more of a peer-to-peer network, where net switches share equal amounts of routing intelligence and cooperate to route or switch data as needed. LAN-based switches can also route frame traffic and topology discovery information over the wide-area network to other edge switches, which will deliver the data to the intended devices.

"We believe there's an expectation of high bandwidth in the backbone *and* in the workgroup," Collins says.

Central to Bay Networks' routing strategy is the deployment of a proprietary extension to the PNNI standard. Bay Networks' IPNNI is a set of proprietary interfaces that map routing data from protocols such as IP, DECnet and Novell's IPX for transmission across PNNI links (see Figure 1, page 79). It is also the firm's proposed implementation of the ATM Forum's Multiprotocol over ATM standard.

IPNNI will enable a router, for instance, to propagate routing information across an ATM net to other routers. "They talk to each other as routing peers," Collins says. "They hold a common view of the topology, of the paths and of the costs associated with those paths." That's in stark contrast to CiscoFusion, where data paths for each protocol are established independently of one another.

IPNNI will also allow users to extend ATM QoS parameters to leg

Continued on page 8

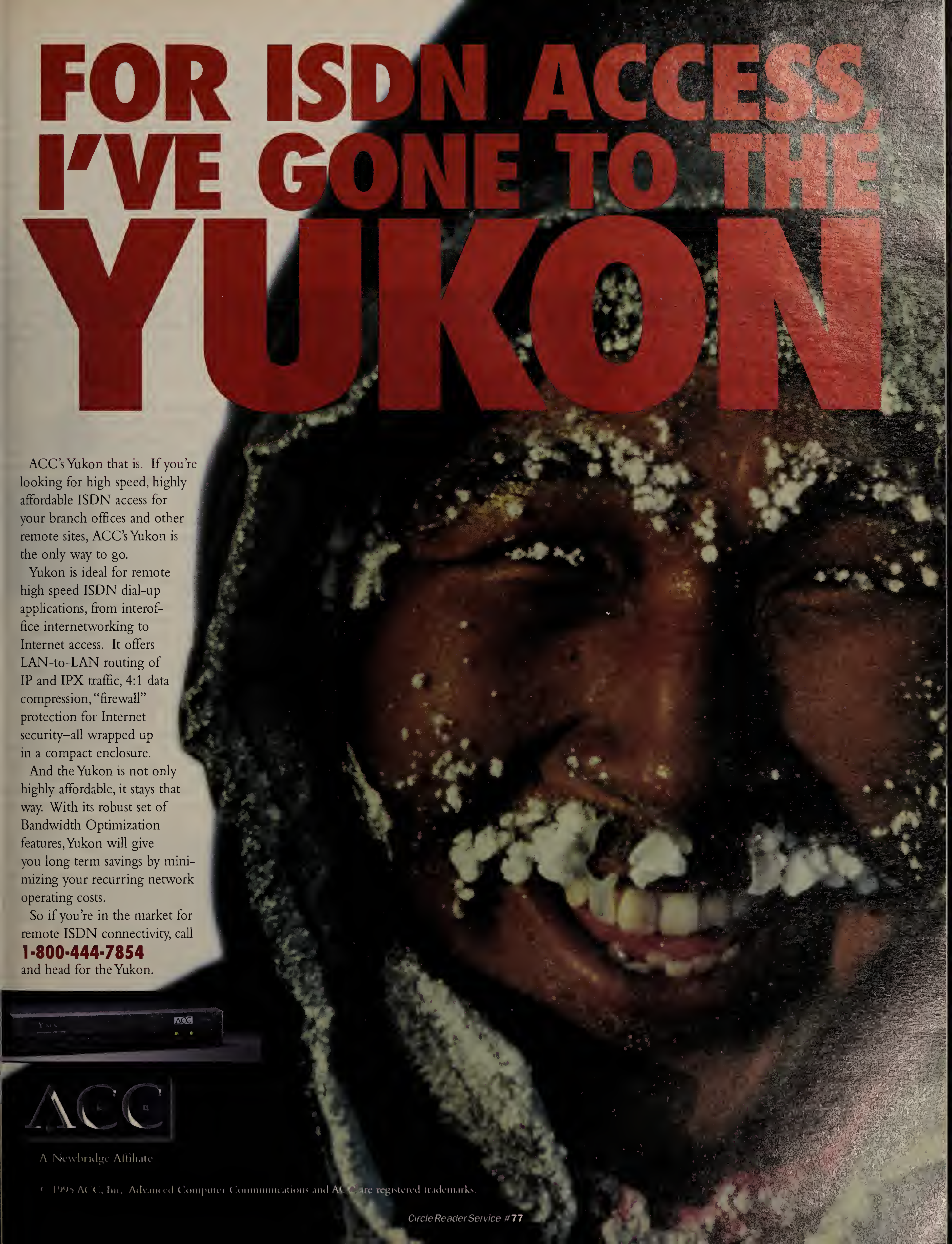
Stacking up the architectures

Figure 2

	BaySIS	CiscoFusion
Type of architecture	Distributed	Client/server via route server
Core technology	Integrated Private Network-to-Network Interface (IPNNI)	Internetwork Operating System (IOS)
Systems supported	Hubs, routers, frame switches, cell switches	Routers, frame switches, cell switches
Communications protocol/service used between VLANs	LAN emulation, 802.1, proprietary	LAN emulation, 802.1, Inter Switch Link (ISL) (1), proprietary
Support for policy-based routes (2)	Future	Future
Support for ATM QoS parameters	Future (via IPNNI)	Future
Deployment	Second-half 1996	IOS ships now; full availability of CiscoFusion due in mid- to late 1996

(1) ISL is a protocol for supporting VLAN users over fast Ethernet subnets.
(2) Policy-based routes enable ATM users to centrally define a set of filters to manipulate net conditions such as traffic flow, delay or security.

SOURCE: STRATEGIC NETWORKS CONSULTING, ROCKLAND, MASS.



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Continued from page 80

acy LAN systems, according to Bay Networks. "We can deliver the type of routing needed at the network layer by defining parameters via QoS," Brown says.

BaySIS may sound like it provides a much tighter fit with ATM than does CiscoFusion, but some analysts warn that integration may come at the expense of openness.

"On the surface, BaySIS appears to be a lot of motherhood and apple pie, but there likely will be some element of proprietary protocol to get the real value-add," Morency says.

One potential sore spot with BaySIS is in the area of network management. What drives buyers to products is ease of administration and lower cost of ownership, according to Passmore.

Requiring a router in every switch explodes the number of routers you have to administer.

"It's going to be incumbent on Bay to develop the requisite software to hide some of that complexity," he says.

Waiting in the wings

While Cisco and Bay Networks have been the most vocal about switched internetwork architectures, they are by no means the only players.

Newbridge has been in the race since 1993 with its VIVID architecture, which, in many ways, parallels CiscoFusion. But analysts don't give it much of a chance to flourish in corporate nets because Newbridge, which is a major player in the T-1 multiplexer market, cannot claim similar success in the router or hub business.

Newbridge says that's actually an advantage.

"We don't come in pushing a big Cisco 7000, so our costs are a lot less than Cisco's," says Peter Rauch, assistant vice president of VIVID marketing. VIVID, he says, supports a virtual router, with routing functionality distributed to edge devices such as switches, as well as central route servers based on Sun Microsystems, Inc. SPARCserver technology.

Morency isn't buying that argument.

"They don't have the credibility to come into a user and add value to the LAN investment without implementing ATM in some way, shape or form. If a user wants to incrementally build to ATM, there's no way to use VIVID to do that," he says.

Newbridge does offer its Blue Ridge token-ring and Yellow Ridge Ethernet switches, but with one OC-3 ATM connection on each, ATM still figures in as the means to tie those devices together.

Digital's enVISN

Where Newbridge may have some issues to address, analysts say Digital Equipment Corp. has constructed a credible switched internetwork architecture called the Enterprise Virtual Intelligent Switched Networks (enVISN).

Digital's enVISN is closer to Bay Networks' approach in that route determination and packet forwarding functions are both collapsed into all the switches in the network, creating a pool of peers.

"The biggest difference with our architecture is we give users the ability to design and build the network the way they want to run their business," says Bill Hawe, Digital's technical director for network products.

"The biggest difference with our architecture is we give users the ability to design and build the network the way they want to run their business."

Bill Hawe

"Digital says it will sell you switches and put routers in the same box," Passmore says. "That could get costly."

Digital is also portraying enVISN as an open architecture because it offered up its LAN-emulation software and credit-based flow control technologies for other vendors to adopt. And Hawe points out that Digital is feverishly working to offer enVISN tools across a broad spectrum of management platforms.

But analysts bristle at the suggestion that Digital is more open than other vendors. "Digital is no more open than the other guys," Passmore says. "When you're in the second or third tier, you've got to say things like that to command attention."

IBM's wrinkles

One vendor that already commands attention with large customers is IBM, which recently launched its Switched Virtual Network (SVN) blueprint. SVN stands a good chance of winning customers' mind-share, Nolle says, because it extends well beyond other vendors' attempts to articulate a role for ATM.

Continued on page 85

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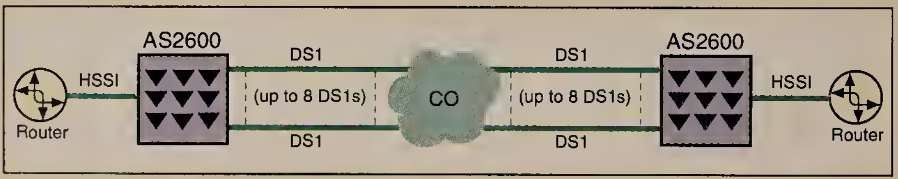

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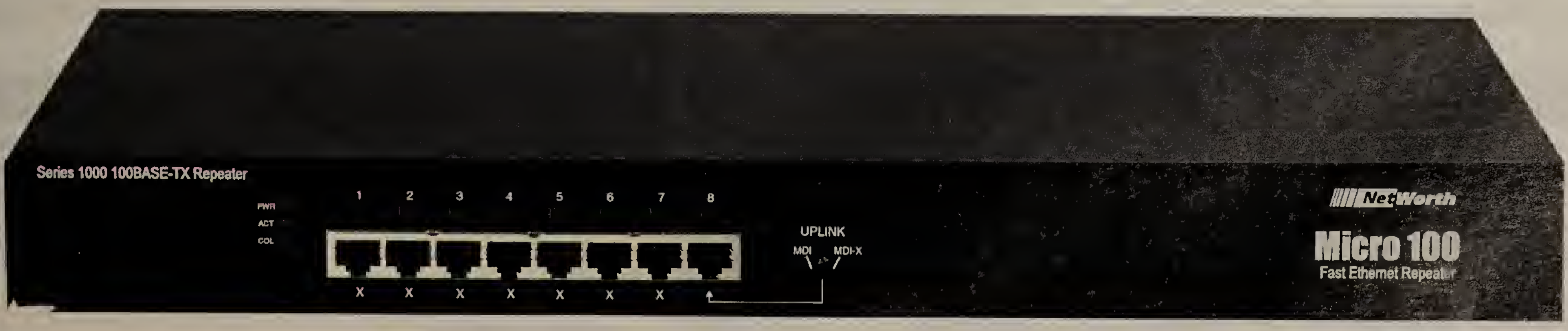

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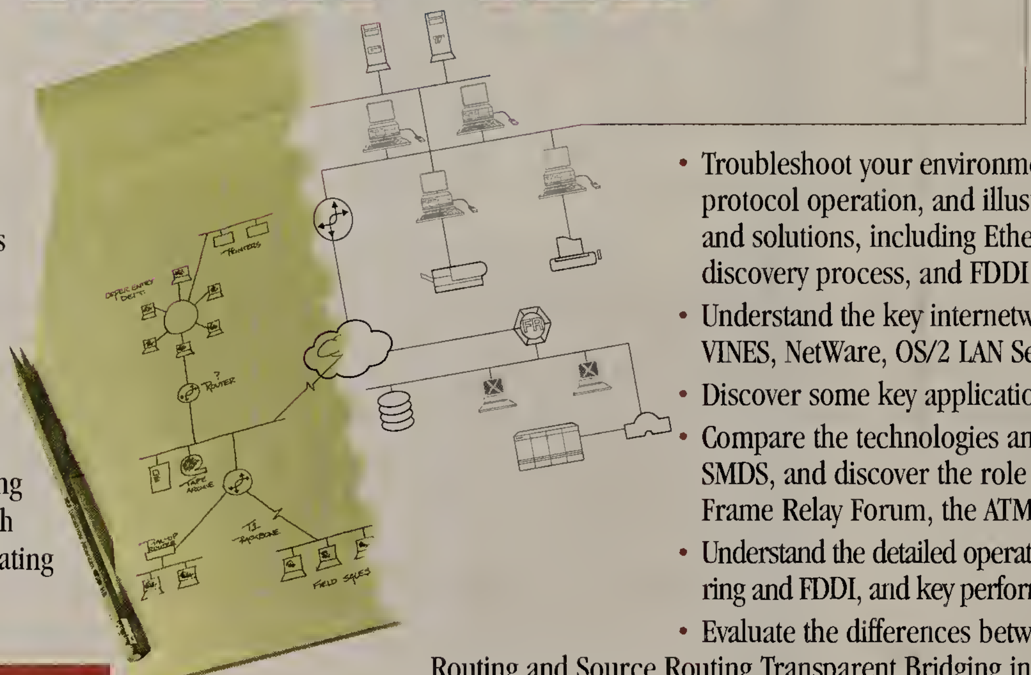

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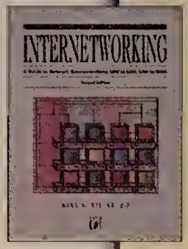

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SYMPLEX COMMUNICATION

Continued from page 82

IBM, for instance, is pushing ATM to the desktop, which Cisco and others have ignored. And IBM's strategy emphasizes switching and seeks to reduce routing.

"Our competitors center their strategies around routers," says Barbara Leonard, program manager for ATM and switch marketing at IBM. "We think the industry will move to a largely switched environment where routing is a function of the switch."

In a nutshell, SVN closely parallels CiscoFusion and VIVID. It embraces the concept of a route server and distributes some frame forwarding functions to network edge switches. But SVN has a few interesting wrinkles, too.

The University of Miami's Rosenstiel School of Marine and Atmospheric Science uses ATM to handle between 15G and 20G bytes of satellite data input and 10G bytes of output each day.

For instance, the route server does more than calculate data routes; it handles broadcast server support and LAN-emulation server and directory functions, she says. And the distributed client not only runs on edge switches, but, in some cases, can be loaded onto workstation adapters.

"That enables us to run some functions like LAN emulation locally to improve performance and reduce latency," Leonard says.

Adds Nolle, "IBM is going to be a market definer. It is raising issues in its positioning of SVN that are going to challenge some of these other architectures." Among those issues is the idea of 25M bit/sec ATM to the desktop, he says.

"On the surface, BaySIS appears to be a lot of motherhood and apple pie, but there likely will be some element of proprietary protocol to get the real value-add."
John Morency

But Morency questions IBM's ATM opportunity, given the company hasn't done exceptionally well the in the hub market. "The 8260 doesn't have the dominant presence of other gear," he adds.

He says customers want to incrementally move to ATM and LAN switching, and hubs are the integration point.

Delmarva Power's Scoggin agrees.

"Since we've used MMACs [from Cabletron], we've been able to move to Ethernet switching by swapping in a single module. We've had very low failure rates. Why argue with that strategy?"

Cabletron's broadcast killer

If other customers think the same way, Cabletron would seem to be in an ideal position.

Cabletron's Synthesis architecture stands out because it attempts to establish a telephony type of network that is free of broadcasts.

Novell Server Advertisement Protocol messages and TCP/IP Address Resolution Protocols are caught by the first switch they encounter. That switch grabs each frame, extracts header information and sends it to a central route server. Any devices that need topology data relating to the frame consult the route server.

"The point is to make it look like a virtual circuit net more than a broadcast-oriented net," Passmore says.

Synthesis, which has been the most centralized architecture, seems destined for more of a distributed approach along the lines of what Bay Networks and Digital have embraced, analysts say.

Whatever the case may be, users like Convex's Gibson want all the architectures to provide a high degree of openness and the lowest common denominator of functionality to promote multivendor support in switched internets.

"In this day and age, the stuff is all driven to a commodity level. Our expectation is to buy a piece of equipment, plug it in and have it provide a core set of services every product in that category needs," Gibson says. "If it can't do that, the product shouldn't be on the market."

Delmarva Power's Scoggin is waiting for standards to develop.

"It's good these proprietary solutions are being done now," he says. "Vendors are getting experience with what works and what doesn't. But there's no overriding reason for me to take part now in a first round of trial and error." ■

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NetworkWorld
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NOS review series
— Part III —

Serving up Windows on the network

Windows NT Server proves to be a tough competitor in the network operating system sweepstakes.

By John Allen, Tony Croes, Howard Marks and Josh Penrod

Compared to NetWare and VINES, Windows NT Server version 3.51 is the new kid on the network operating system (NOS) block, but it's that overly bright new kid who grows up to be Bill Gates.

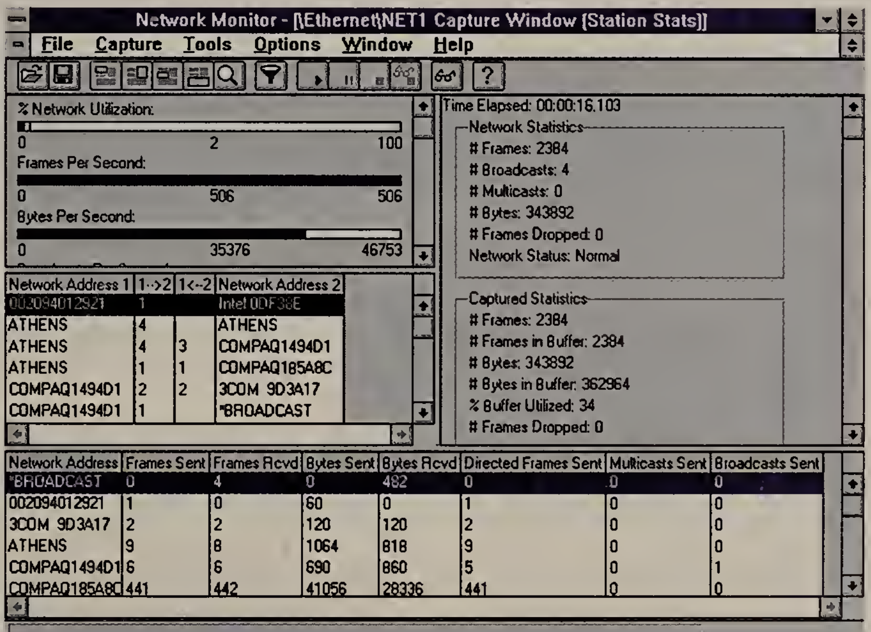
We found NT's domain services to be quite comparable to the directory services of NetWare and VINES, contrary to what Novell, Inc. and Banyan Systems, Inc. may say. While Microsoft Mail has some deficiencies, the beta version of Exchange Server we looked at holds the promise of some exciting new group collaboration and scheduling functionality. And Systems Management Server (SMS) is a terrific tool for managing user desktops, even though its lack of Simple Network Management Protocol management capabilities leaves it without Banyan DeMarc's greatest strength.

A domain directory

The directory services in Microsoft Corp.'s Windows NT Server and IBM's LAN Server 4.0 show these products' common roots in Microsoft's LAN Manager 1.0. They share a basic domain-based naming architecture, so we've compared the two below.

In both systems, a domain is a group of servers that share a common database of users, groups and security restrictions. One server is declared at installation time to be the domain's primary controller and holds the master copy of the domain database. This server is also where you make changes to the domain database, such as adding a new user or changing a current user's access rights.

This design by itself works fine for a small network, but a naming system that relies on a single server to handle all access to the name database would quickly bog down as the network grew. Therefore, both LAN Server and Windows NT Server allow you to declare one or more of the other servers in a domain to be a backup or secondary domain controller. Each secondary has a copy of the domain database and can validate user logons. When the administrator makes changes to the domain database, the primary domain controller replicates the changes to the backups.


Network Monitor - [\Ethernet\NET1 Capture Window (Station Stats)]
File
Capture
Tools
Options
Window
Help

% Network Utilization: 0 2 100
Frames Per Second: 0 506 506
Bytes Per Second: 0 35376 46753

Time Elapsed: 00:00:16.103

Network Statistics
Frames: 2384
Broadcasts: 4
Multicasts: 0
Bytes: 343892
Frames Dropped: 0
Network Status: Normal

Captured Statistics
Frames: 2384
Frames in Buffer: 2384
Bytes: 343892
Bytes in Buffer: 362964
% Buffer Utilized: 34
# Frames Dropped: 0

Network Address 1	1-->2	1<--2	Network Address 2
002094012921	1		Intel 0DF38E
ATHENS	4		ATHENS
ATHENS	4	3	COMPAQ1494D1
ATHENS	1	1	COMPAQ185A8C
COMPAQ1494D1	2	2	3COM 9D3A17
COMPAQ1494D1	1		*BROADCAST

Network Address	Frames Sent	Frames Rcvd	Bytes Sent	Bytes Rcvd	Directed Frames Sent	Multicasts Sent	Broadcasts Sent
*BROADCAST	0	4	0	482	0	0	0
002094012921	1	0	60	0	1	0	0
3COM 9D3A17	2	2	120	120	2	0	0
ATHENS	9	8	1064	818	9	0	0
COMPAQ1494D1	6	6	690	860	5	0	1
COMPAQ185A8C	441	442	41056	28336	441	0	0

SMS' network monitor *helps administrators track network traffic.*

Both systems provide robust replication services between primary and backup domain controllers, including facilities that keep track of what domain database updates have been sent to each backup controller. If a WAN link to a backup controller, or the controller itself, goes down, these systems know what information to send to bring themselves back in sync. On our test network, an NT Server that was down during a block of user adds was resynced in seconds.

Thanks to the backup domain servers, users can still log on to the domain and have access to all file, print and other resources — except, of course, those that are on the primary controller itself — should the primary domain controller go down. While the primary controller is down, administrators cannot update the domain database and therefore have to either repair the domain controller or promote a backup domain controller to take over.

Promoting a Windows NT Server backup domain controller to become the primary controller takes just a few seconds and a few mouse clicks. Making the promotion under LAN Server is a bit more difficult, requiring a command-line utility. LAN Server's documentation also lists under administrative duties manually backing up of the domain database. This could mean that IBM believes the restorations are needed regularly or simply that the company's mainframe "suspenders and belt" attitude is showing through. We can't say for sure since we were unable to corrupt the database on either system.

Placing multiple servers in a domain lets both LAN Server and Windows NT Server provide a single point of logon to all file and print resources on the servers in the domain. It also provides a single point of administration, allowing you to grant any users in the domain acces to any domain resource.

Windows NT Server allows you to configure the frequency and size of domain database replication packets so replication traffic won't swamp your network's low-bandwidth links. We were unable to find an equivalent feature in LAN Server.

LAN Server allows servers to be part of a domain but not act as a domain controller. These additional servers have no logon database and rely on the domain controllers to provide validation. You can still grant access to these servers to users in the domain just as you do to a primary or backup domain controller.

The Windows NT Server model places these additional file and print or application servers outside all domains. The network administrator must grant access to the resources on this

Continued on page [illegible]

NetResults

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Vendor
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Windows NT Server license: $699
Client access license: $39.95
Microsoft Mail Server 3.5: $469; price includes 10 client licenses
Systems Management Server 1.1: $649
Client access license: $34.95 when purchasing 20 or more

Key findings

- Flexible domain naming system is roughly equivalent to directory services of NetWare and VINES.
- No true location-independent access to data — server name is required when specifying objects.
- Microsoft Mail is an aging shared file- and directory-based messaging service, but upcoming Exchange Server holds much promise.
- SMS offers top-notch user management features but no support for SNMP management.

Continued from page 87

server by specifying both the user's ID and home domain.

While both NOSes offer domain naming services, they are nevertheless true directory services in our opinion. The fact that they are domain-based means they have either multiple independent (in the case of LAN Server) or interdependent (Windows NT) databases instead of a more flexible, single, partitioned database such as NetWare Directory Services (NDS) or StreetTalk. This flexibility is apparent in the case of a server in a field office where the sales staff for four divisions share space on a single server. With a directory service, the server can have the partition data for all four divisions. In a domain structured system, the server can be in only one domain.

Microsoft has extended the domain concept in Windows NT Server by providing network administrators with the ability to create trust relationships between domains. Microsoft borrowed this concept from the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE): Trust relationships allow a user logged on to one domain to access resources in others. For example, to let users from the accounting domain access resources that are part of the manufacturing domain, you would create a relationship where the manufacturing domain trusted the accounting domain.

Once this relationship is established, administrators in the trusting domain, manufacturing, can grant access to resources in their domain to users and global groups in the trusted domain. Servers in the trusting domain validate guest users with the domain controller in the trusted domain, then grant access to resources if the user has the right permissions.

Members of both local and global groups can be granted access permissions. Global groups are visible outside the domain they are in, so they can be used to grant access to resources in trusting domains. Local groups are only useful within the domain, but they can include global groups as members. So, for example, if all the domains in your network trust the MIS domain, you can make the global group administrator from MIS a member of the local group of administrators for all the other domains. That would make the MIS group's administrators masters of all domains.

Trust relationships are unidirectional; just because Domain A trusts Domain B doesn't imply that Domain B trusts Domain A. Trust relationships also only extend to the explicitly trusted domain; if Domain A trusts Domain B, which in turn trusts Domain C, that doesn't mean that Domain A trusts Domain C.

LAN Server doesn't currently support trust relationships, but IBM is promising support as part of a future LAN Server extension that fully implements DCE. With the current version of LAN Server, IBM solves the problem of allowing a single point of logon for a user by allowing a workstation to log on to multiple servers in different domains simultaneously as long as the user employs the same ID and password on all the servers.

But LAN Server doesn't really address the additional administrative overhead of maintaining a user account on all those servers. About all it lets you do is administer several domains without logging back on, as the administration utility allows you simply to select the domain you want to administer from the displayed icons.

If you're planning a new network, you can think of domains — especially in Windows NT Server — as being similar to NDS partitions. Both include groups of file servers and their associated objects in a replicated database. A partition is a section of the database starting at a container object and extending down the tree. Partitions allow administrators to control the parts of the database that are replicated to different servers for load-balancing or to limit replications across the WAN. Like a domain, a partition usually contains several file servers.

Windows NT Server does a better job than LAN Server of providing a single point of logon and a single point of administration. This is made even more evident by limitations in LAN Server's graphical user interface (GUI) tools. You need to use command-line utilities much more often with LAN Server than with Windows NT Server. The most significant example of this is LAN Server's User Profile Manager, the GUI tool used to manage user accounts. It can handle only about 1,800 users per domain. Microsoft's User Manager for Domains has no such limitation. A command-line tool supports higher numbers of users, but it lacks even a menu interface.

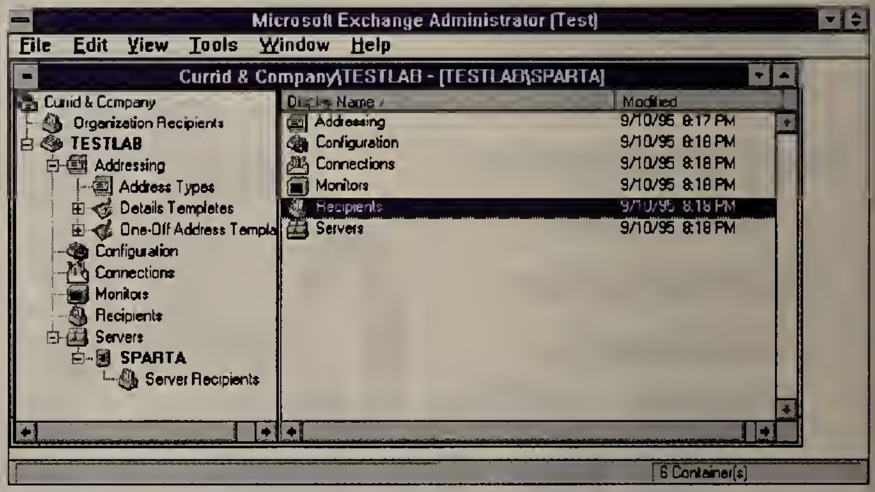
LAN Server does provide a few properties for user objects that Windows NT Server doesn't, allowing you to define drive and printer assignments and the applications that appear in the public applications folder on OS/2 desktops.

Windows NT Server has no provisions for providing location-independent access to data. Data resources are addressed by the Universal Naming Convention that includes the server name and the name of the shared resource. By contrast, NDS and StreetTalk allow a user to access a resource by name without specifying the server it is on. This allows you to relocate resources without any change to the way users access it.

LAN Server allows you to use aliases, which define a file or print resource in a location-independent way. Once an alias is defined, a user can assign a drive or printer port to the alias without referring to a server. Administrators can move the resources from server to server and just redefine the alias to let all the users access the resource.

Both Microsoft and IBM are beginning to address unifying file and print service directories, as well as the directories for other application services on the network. The LAN Server user database is shared by OS/2 Database Manager, while Windows NT directory services are also used by the Microsoft BackOffice applications, including SQL Server and SMS.

Microsoft has made three recent announcements about the future direction of Windows NT directory services. The first, Directory Service Manager for NetWare, a Windows NT Server add-on, allows you to copy user accounts from NetWare 2.X and 3.X file servers' binderies to Windows NT Server's directory service. It also lets you manage those user accounts on both NetWare and Windows NT Server from Windows NT Server's User Manager for Domains.



Exchange Administrator *provides centralized management for a complete site.*

The second announcement, Open Directory Service Interface, defines a series of Windows APIs that allow application developers to use and manage multiple heterogeneous directory services through a common API, and eventually through a common user interface.

Finally, Microsoft has announced that the directory service in Cairo, a future version of Windows NT Server, will integrate with the file system, providing a single object-oriented directory for access to files and directory objects.

Messaging is Mail

While domains are a comparatively recent innovation, Microsoft Mail has been around even longer than Windows NT itself. Despite a new name — Microsoft Mail Server 3.5 — and the fact that it ships with a multitasking message transfer agent (MTA), Microsoft's messaging service is still the same old Mail. Mail does not currently support any integration with the domain-based services of Microsoft Windows NT Server. And, although it is billed as a component of Microsoft BackOffice, Mail is more accurately described as compatible with BackOffice because it's not an integrated component of the server suite.

Messaging systems are composed of three basic components: clients, message storage and an MTA. The MTA is a program running on a server or workstation that is responsible for moving messages from one place to another. Microsoft Mail has two types of message transports: a DOS transport that runs on a stand-alone workstation and an NT transport that can run on a workstation or server.

Continued on page 90

Exchange Server: the next generation

We had a chance to take a look at Microsoft Corp.'s Exchange Server for Windows NT, the second beta version. It is not yet a released product, but if the beta is any indication, it and Microsoft Mail are as different as night and day. Exchange uses a client/server messaging architecture with a back-end data store on the server. It includes scheduling and rules processing capabilities in the base product.

Installing Exchange requires very few mental cycles. All you do is log on to a Windows NT server console as a domain administrator, put the CD in a drive and run the setup program. Virtually everything else is automatic.

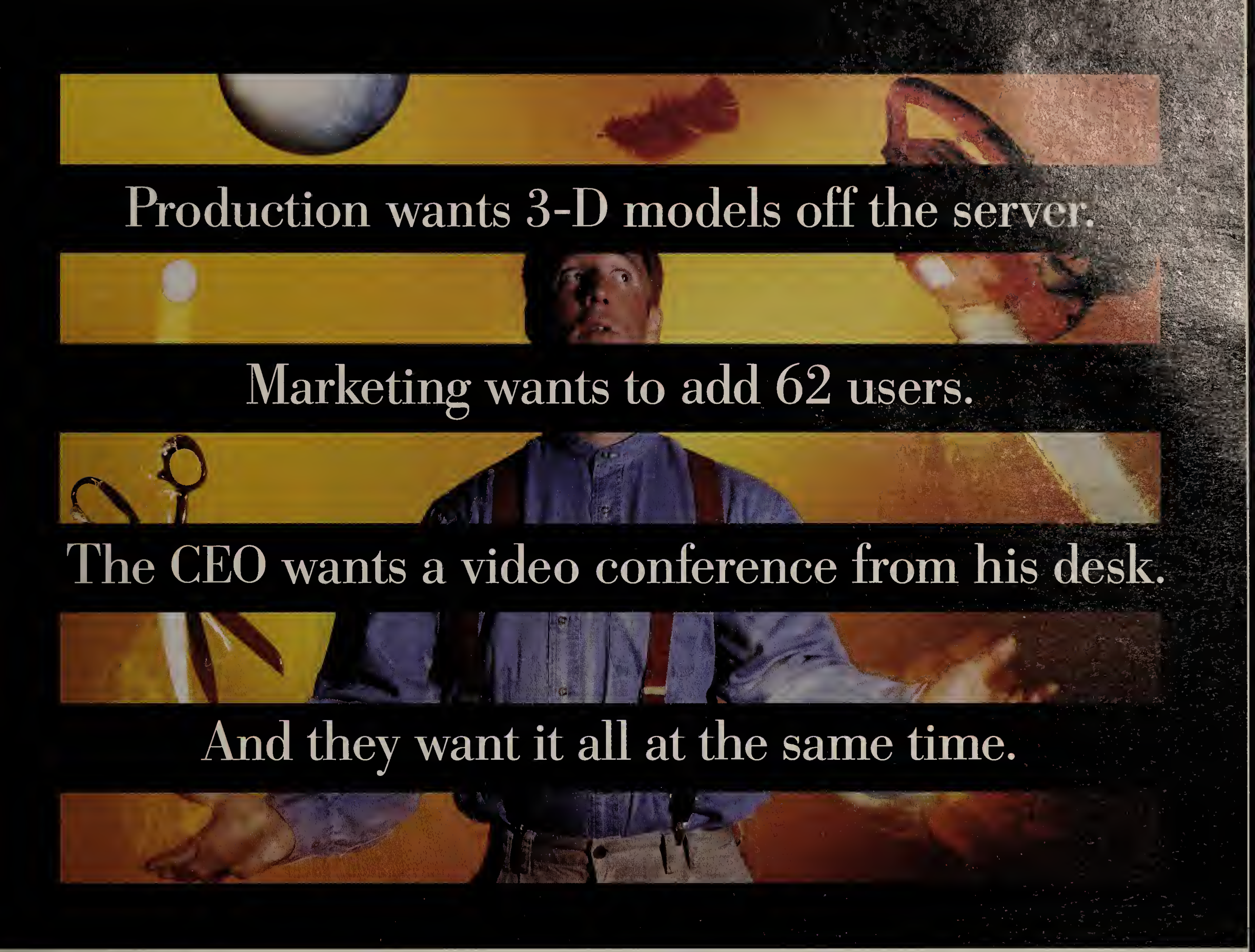
A nice feature is the Microsoft Exchange Optimizer, which tunes Exchange for a particular environment. It asks about the expected number of users on the server, whether the server will be public, private, a backbone or a gateway, and how many users will be in the entire organization. It then sets exchange parameters for best performance in that environment.

Exchange defines a site as groups of servers that are part of the same messaging network. The concept is similar to domains for named Windows NT objects, but the two are not necessarily interrelated. Similarly, while Exchange is based on an X.400 directory service, this service is separate from the domain-based directory services of Windows NT. Exchange replicates the necessary information between Exchange and the domain database.

As you might expect, the migration path between Mail and Exchange is straightforward. Exchange comprises four Windows NT services: the Exchange System Attendant, Directory, Information Store and Message Transfer Agent. As a first step, you can choose to use the Exchange message transfer agent (MTA) in place of the Microsoft Mail MTAs. Two components, Microsoft Mail Connector and Microsoft Exchange Directory Synchronization Agent, work together to synchronize directories across Exchange and Mail.

When you are ready to convert Mail clients over to Exchange clients, you can migrate users from an existing Mail post office to Exchange through the Exchange Migration Tool. The Migration Tool includes a source extractor, which extracts users, in-boxes, folders and address books, and a migration assistant, which converts existing data in Mail to the Microsoft Exchange Information Store.

Exchange Server is a true client/server messaging product that supports directory services and offers far more functionality than Mail. We're looking forward to experimenting with the final release. If the beta is any indication, Exchange looks like it will bring some formidable and welcome changes to tired old Microsoft Mail.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Continued from page 88

The message store in Microsoft Mail, called a post office, remains a shared-file and -directory structure that resides on any DOS-compatible server.

Installing Mail is a matter of determining where to install post offices, setting up MTAs to transfer messages between post offices, installing Mail clients on workstations and setting up user mailboxes.

However, you might have a little trouble trying to figure this out from the documentation — it's terrible. Other than a setup card that attempts to convey the steps simply, the documentation appears written with the assumption that you will read it from cover to cover. There are no road maps or hints.

While the Microsoft Mail documentation is complete, it's tedious because it's organized feature by feature rather than task by task, the way someone would actually use the product.

You administer Mail with the ADMIN program, a DOS-based utility that can be run on any client workstation that controls mailboxes, definitions for external post offices, directory synchronization, gateways, remote users and message queues. The ADMIN program manages a single post office at a time, though if you have access to the administrator's mailbox and shared directories where other post offices are stored, you can use ADMIN to manage them, as well. There is currently no Windows-based administration tool.

With ADMIN, you can set options on user mailboxes for user, user access, group and folder privileges, and whether to include the user in directory synchronization. User privileges determine whether the user is an administrator of the post office. User access privileges determine what rights users have for manipulating messages, including the right to delete, retrieve, send, send urgent and external messages, which are messages sent to other post offices. Folder privileges determine the level of control the user has over private, group or shared folders.

Microsoft Mail supports directory synchronization between post offices for a global address book. Mail directory synchronization can be either manual, where an administrator exports the address list and sends it to other post offices, or automatic, where updates are sent out according to a schedule defined by an administrator. Schedules must be set individually for each server.

Reviews of Banyan VINES 6.0 and NetWare 4.1 are available on Network World Fusion. Point your Web browser at http://www.nwfusion.com. After you log on, select NetRef and then Reviews and Buyer's Guides.

If you plan to use automatic directory synchronization, you must use ADMIN to define the external post offices with which information will be shared. One post office must serve as the "home" or primary post office, while the others are "requesters" of the update information. When directory synchronization is set up and the MTAs are running, updates to address books on participating post offices are automatic.

Mail clients

Microsoft Mail currently has clients for DOS, 16-bit Windows, OS/2 and Macintosh desktops. Windows NT Workstation and Windows for Workgroups automatically install a Mail client. All users need to access a post office are the user name and password for their mailbox, as well as the necessary file access permissions in the post office directory (\MAILDATA by default). The client asks if the user wants to connect to an existing post office when the client starts.

Presentation Manager and Windows 3.1 clients must run PMSETUP or SETUP from the executable mail files directory on the server. One caveat: Make sure you edit the MSMAIL.INI file in that directory to point to the shared drive that all clients use for accessing the post office. Otherwise, the Mail client gives an error stating that it can't find the post office when executed. If users are going to use different shared drives to access the post office, they must modify the ServerPath= line under the [Microsoft Mail] section of MSMAIL.INI.

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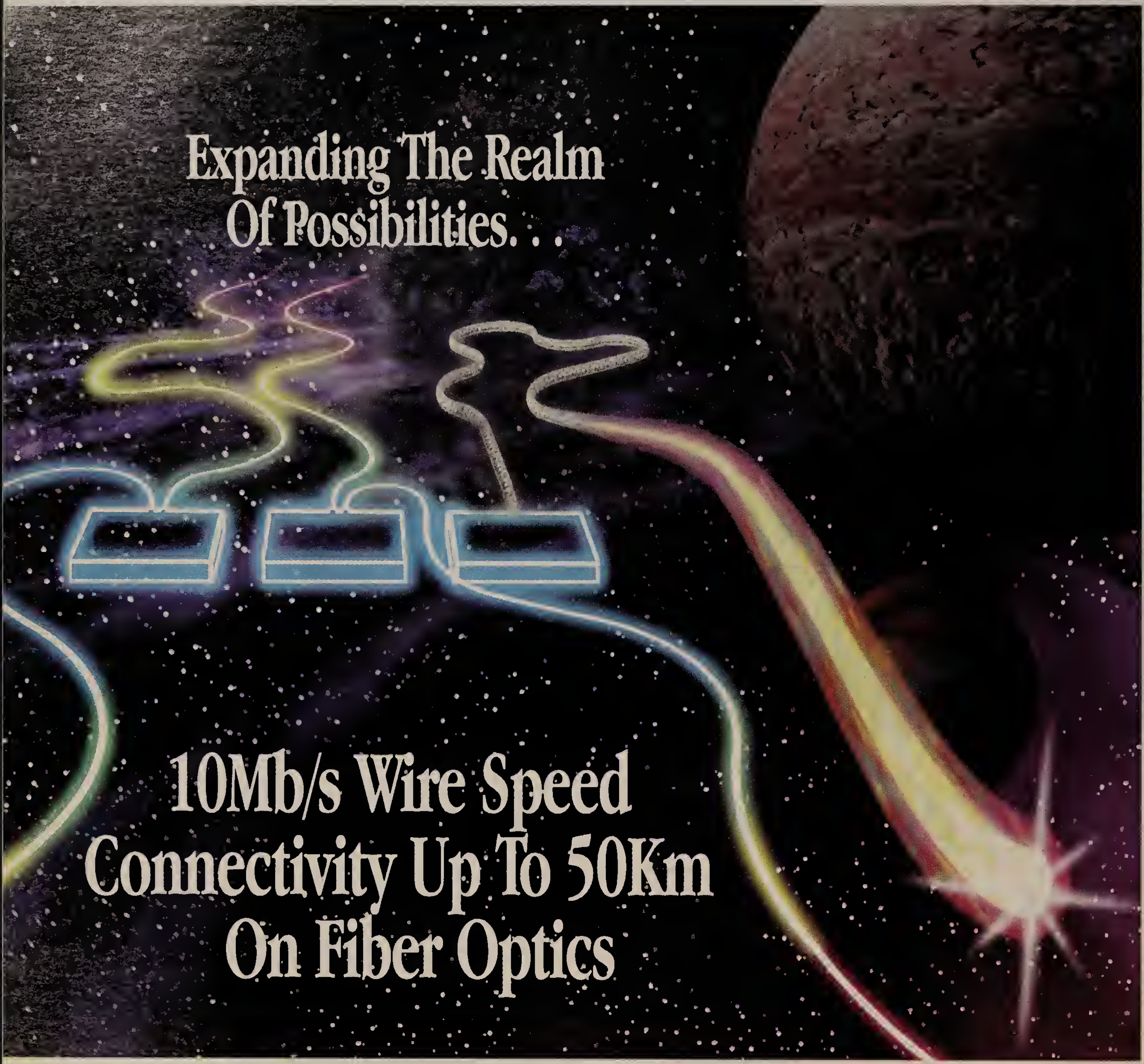

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Continued from page 90

While Windows NT's current messaging system may be old hat, the same cannot be said of its management component. SMS Version 1.1 provides powerful features for managing workstations and servers. One huge plus for SMS is that its functionality is not limited to the Microsoft universe. SMS can effectively manage and support DOS, Windows, Windows for Workgroups, OS/2, OS/2 Warp and Macintosh clients, as well as NetWare 3.X (and 4.X in bindery emulation mode), LAN Server and LAN Manager servers.

SMS gives you lots of help in hardware and software inventory and management, software distribution, software metering, client help desk functions (remote control and troubleshooting) and some rudimentary traffic monitoring.

On the down side, SMS currently does not support SNMP management, as Banyan's DeMarc does. A recent acquisition of Network Managers, Ltd. by Microsoft, providers of SNMP enabling technology, should fix this problem in future releases. SMS also seems to require a lot of hardware and software resources, which may be overkill for smaller networks.

Finally, SMS' hierarchical structure does not consider the network as a single entity. SMS divides the network into geographical groupings called sites, which provides flexibility for installing network management but still leaves several points of administration.

To install SMS, you must have an SMS server license and user licenses equal to the number of nodes managed, as well as at least one 20-user copy of SQL Server 6.0 for storing all of the data that SMS tracks. At a bare minimum, you need one Windows NT Server 3.5X server with more than 100M bytes of disk space and 20M bytes of RAM. The RAM recommendation expands to 28M bytes if SQL Server is run on the same machine.

Building the hierarchy

An SMS site can contain one or more Windows NT Server domains. In a multiple-domain setting, you must set your interdomain trust relationships so the SMSAdmin account (or a similar account created in one of the domains) has full control of all resources in all domains.

A primary site under SMS is a site that supports a SQL Server database. A secondary site must send information to a parent primary site. The secondary site and its parent do not share information; they have separate databases running on the parent's SQL Server.

A primary site can also have another primary site as a child. The child writes its information to its own SQL Server database, then passes the information up to the parent for storage on the parent's SQL Server database. Information is passed up in this manner to the top of the hierarchy to a central site. This special primary site contains all of the SMS data for the entire network.

Each site has to contain several components for SMS to do its job. Among them is a site server, a computer running both Windows NT Server and SMS. It generally serves as the console for that site.

Each site must also have its own SQL database, but only primary sites need the SQL Server to support those site databases. The SQL Server databases can be run on the site server or a helper server.

One of the key features of SMS is automated software distribution. When SMS sends software to a site to be installed by the clients of that site, the software package is sent to a distribution server. In this way, only one copy is sent to the site, keeping network traffic to a minimum.

Similarly, a logon server authenticates user logons for the domain and serves as a transfer point between client information and the site server. When an SMS-enabled client logs on to a logon server, programs run from the logon script and upload the information that SMS tracks for inventory purposes from the client to the logon server. This is where it is gathered by the site server at a later time. Interestingly enough, a logon server or a distribution server can be a NetWare, LAN Server or LAN Manager server in addition to a Windows NT Server.

Larger networks have more information to track and software to distribute. Judicious use of helper servers for each site can improve SMS' performance. However, the site server can perform all of these functions when separate servers are scarce.

Tracking the elusive details

Assuming you successfully weave through the maze of site and domain permissions and trust relationships, you should have a pretty effective tool for

Continued on page 94

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Continued from page 92

managing your networks. SMS keeps track of the hardware and software configuration of all the SMS-enabled nodes. This information includes client identification information (such as name and domain), workstation status (such as date of last scan or software not installed), processor type, operating system, network addressing, network card settings, hard-disk information, total memory, mouse hardware installed, active services and DOS environment variables.

All of this information is easily accessible via the SQL database using simple customizable queries. This information can be invaluable when planning to upgrade your network or troubleshooting individual machines.

SMS lets you install new software packages on workstations or servers automatically without having to visit each computer. SMS creates a package containing the software to be installed, a program to begin the process and a job to deliver the package to the proper recipients.

You can control exactly who gets the software installation — down to the individual workstation or server level and up to a blanket upgrade of all workstations capable of supporting the software — according to any user-defined parameters. You can even control when the distribution takes place and how often the job is repeated.

SMS helps prevent applications running on NT servers from being accessed by more users than you care to permit. You can limit the number of concurrent clients allowed to access shared resources through Windows NT security functions. You can also let a client search for a shared resource that contains a copy of an application that has available connections.

SMS has a service for monitoring network traffic, called Network Monitor, that copies network packets from the network interface card for analysis. Not all frames are useful, so Network Monitor allows you to filter the sample down by frame type. Frames can be edited and retransmitted to test remote devices or reproduce network problems.

One of the more useful troubleshooting functions in SMS is remote control. When a user complains of a network problem, the administrator can take control of the computer, view exactly what is happening and try to determine a solution.

The database of hardware and software information can be invaluable at this point to see exactly how the client is set up. SMS even allows a split-window chat mode for communication between the user and the administrator. If the client happens to be running Windows NT, the administrator can run NT's remote diagnostic programs.

We liked SMS' tools for software distribution and metering, as well as its remote control features. Where SMS needs help, and where Novell's ManageWise and Banyan's DeMarc excel, is in the area of network infrastructure management. SMS' lack of ability to serve as an SNMP console is a hindrance.

Microsoft appears to know this and seems to be taking steps to fix it in future versions of SMS.

Looking ahead

Windows NT Server is the most up-to-date of the NOSes we looked at. Its architects learned from the mistakes of NetWare 2.X and 3.X, as well as Microsoft's own LAN Manager.

Windows NT Server provides not only an enterprise-scale domain service and good management tools, but also a stable architecture for server-based applications and competitive file and print services for organizations of various sizes.

Its homegrown messaging system is a weak spot, but the upcoming Exchange Server should help change that.

If you haven't already done so, this might be a good time to bring in at least one Windows NT Server for evaluation. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 73.

Allen is a consulting systems engineer for Attachmate Corp. in Bellevue, Wash. (johnal%atmcorp.atm@zip.atm.com); Croes and Penrod are industry analysts with Currid & Co. in Houston (croes and penrod@ ngwgate.mhs.compuserve.com); and Marks is a principal of TigerTeam, a South Norwalk, Conn.-based consulting firm (hmarks@pipeline.com).

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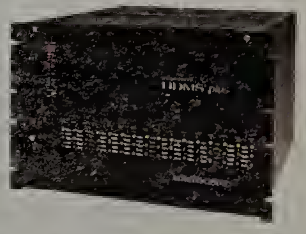

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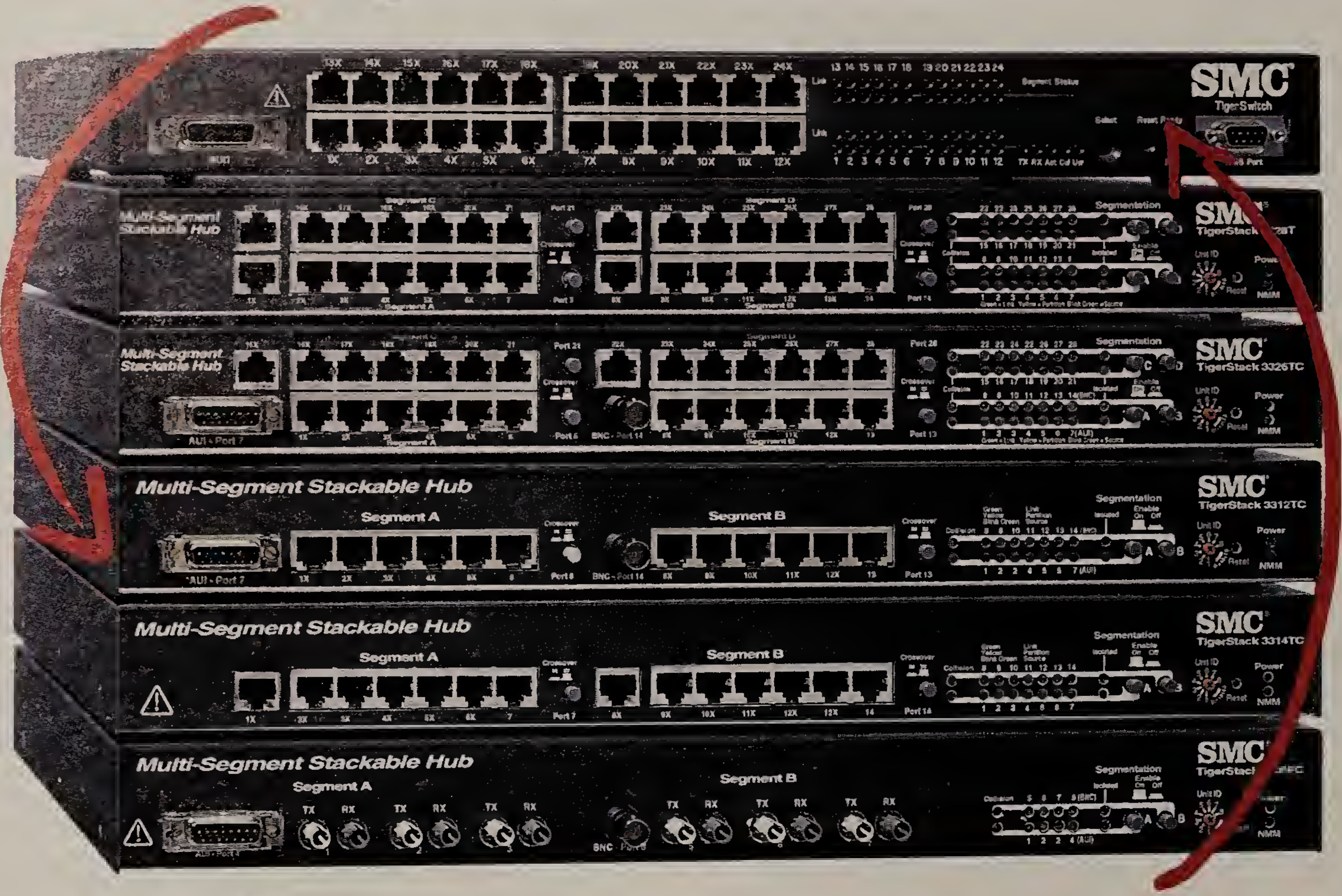

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SNA

By Anura Gurugé

BATTLE ROYAL

Part II:

APPN comes alive

In our May 1 issue, we compared two competing methods — DLSw and RFC 1490 — for carrying SNA data alongside multiprotocol LAN traffic. Now APPN is emerging as yet another viable alternative in this battle for SNA traffic.

APPN is back in the news, but this time you might actually want to pay attention because it is not just IBM singing its praises, but the unlikely duo of Cisco Systems, Inc. and Bay Networks, Inc.

Cisco and Bay Networks have implemented an APPN Network Node (NN) within their bridge/routers that not only enables them to route Advanced Peer-to-Peer Networking-based traffic across an internet, but also to support any other type of Systems Network Architecture traffic, from any SNA device located anywhere in the net.

That means both vendors now at long last have all the pieces in place to tempt both mainframe-centric SNA and Application System/400 customers to move to a multiprotocol internetwork that provides native APPN routing for all types of SNA traffic.

Consequently, APPN joins Data Link Switching (DLSw) and RFC 1490 as a third strategic means for building SNA-capable multiprotocol networks.

DLSw (and Cisco's version, dubbed DLSw+) is a method of encapsulating SNA and NETBIOS traffic in IP for transport across a TCP/IP backbone. RFC 1490 is a standard for encapsulating many types of traffic, including SNA, in frame relay. The challenge of choosing between the two was discussed in detail on these pages a few months ago (*NW*, May 1, page 34).

Now the story continues. It's time to weigh the pros and cons of APPN, as well as that of APPN's heir apparent, High Performance Routing (HPR), against DLSw and RFC 1490.

NO REASON TO SWITCH

More than 90% of the traffic in mainframe-centric networks is SNA 3270-based. That's a key reason why, until the recent advent of technologies such as dLUS/dLUR, APPN was not terribly compelling to SNA customers.

Darting between mainframes

Supporting APPN on a router to route LU 6.2-based SNA traffic is nothing new; IBM has touted that capability with its 6611, and 3Com Corp. with its NetBuilder II, since 1992.

Cisco and Bay Networks, however, have added what is effectively a "must-have" extension to NN routing — the so-called surrogate-dependent LU Requestor (dLUR) that enables the routers to support the traditional 3270 traffic that accounts for the vast majority of SNA data (see story, page 101).

It is fair to state that the APPN approach is most likely to appeal only to two classes of customers. The first is those with existing AS/400-based APPN networks that now need to move toward multiprotocol networking. The other is large SNA customers that have four or more IBM mainframes, with different sets of applications on each, and with remote users who need regular access to most of these applications.

In such multimainframe or multi-AS/400 environments, APPN, in marked contrast to both DLSw and RFC 1490, will provide a native SNA session-level routing mechanism. This APPN NN routing will enable remote users to gain direct access to any SNA application irrespective of the mainframe it is located on.

If DLSw or RFC 1490 was being used in such an environment, the remote users would first have to access a "gateway" mainframe, then get routed from there to the appropriate destination mainframe.

This two-hop routing would not be restricted to the initial logon message unit; it would apply to all data traffic.

This is because both DLSw and RFC 1490 are essentially Layer 2 bridging schemes. They rely on the media access control (MAC) address of a destination gateway, such as a 3745 communications controller, as their only means of identifying a required SNA destination. Most remote SNA devices, in addition, do not provide a mechanism whereby the MAC address of their SNA gateway can be dynamically modified

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depending on which mainframe they wish to reach. Thus, with any MAC address-based bridging scheme, whether it be source route bridging (SRB), DLSw or RFC 1490, traffic from any given SNA device can only be initially routed to the gateway corresponding to the predefined MAC address.

Taking the APPN route

APPN does not use MAC addresses as its means for locating destinations, which in the case of APPN are always SNA application programs. Instead, it — like SNA — uses the actual SNA application name.

If the name of the SNA/APPN node containing the desired application is not in its cache directory, the source node will locate it by conducting an APPN-based broadcast search — similar to those used by SRB or DLSw. When an application is thus located, its location will be cached to preclude the need for repeated searches.

Once the location of an application is known, the source node will use the data contained in its Network Topology Data Base along with SNA Class of Service (COS) features to determine the best path through the network. With SNA COS, users can predefine up to nine path selection criteria for each session, including cost, bandwidth and minimum physical security.

APPN NN routing is ideal for multimainframe or multi-AS/400 environments where this type of application name-based routing not only eliminates two-hop paths but also ensures that APPN's sophisticated path selection scheme can be used to select the optimum path to a given application.

In a network with just a single mainframe, APPN NN routing will definitely be superfluous given that there is only one possible destination. DLSw or RFC 1490 will invariably be better options — with the latter likely to be the most efficient, meaning it has the least amount of overhead if frame relay is being used.

Keep in mind that APPN routing will not exactly replicate the traditional SNA subarea-to-subarea routing in a multimainframe net. Such routing takes place across fixed, predefined paths. APPN, by contrast, will dynamically select the optimum path based on the COS selected and the current state of the network topology.

This incompatibility between the two routing schemes is not a major issue provided that network designers are cognizant of it — especially when provisioning bandwidth for the various APPN routes across the network. If one assumes APPN will use the same routes that SNA would have used, some routes would experience overload while others would be hardly used.

IBM's twist — a fourth player

Deciding when to use APPN as opposed to DLSw or RFC 1490 is unfortunately no longer really even a three-way choice. IBM's latest APPN based multiprotocol initiative — the 2217 Nways MultiProtocol Concentrator — adds a unique, IBM-specific, fourth alternative.

With the 2217, IBM is advocating the tantalizing notion of routing multiple protocols — including TCP/IP, IPX/SPX, SNA and NETBIOS — across a single-protocol backbone, that protocol being APPN or HPR.

With a multiprotocol router, all the so-called routable protocols — IP, IPX, VINES, XNS, OSI, AppleTalk and now APPN — are individually routed across the backbone. The so-called nonroutable protocols — SNA and NETBIOS — are transported using a bridging protocol or via an IP-encapsulation scheme such as DLSw.

With the 2217 approach, the backbone interconnecting the 2217s will not only support just one protocol, it will carry only one type of message unit — SNA LU 6.2. The 2217 will use a combination of protocol conversion and encapsulation techniques to route non-SNA traffic across this backbone. Figure 1 shows how the 2217's APPN approach is diametrically opposed to that provided by multiprotocol routers.

Weighing the pros and cons of the SNA players

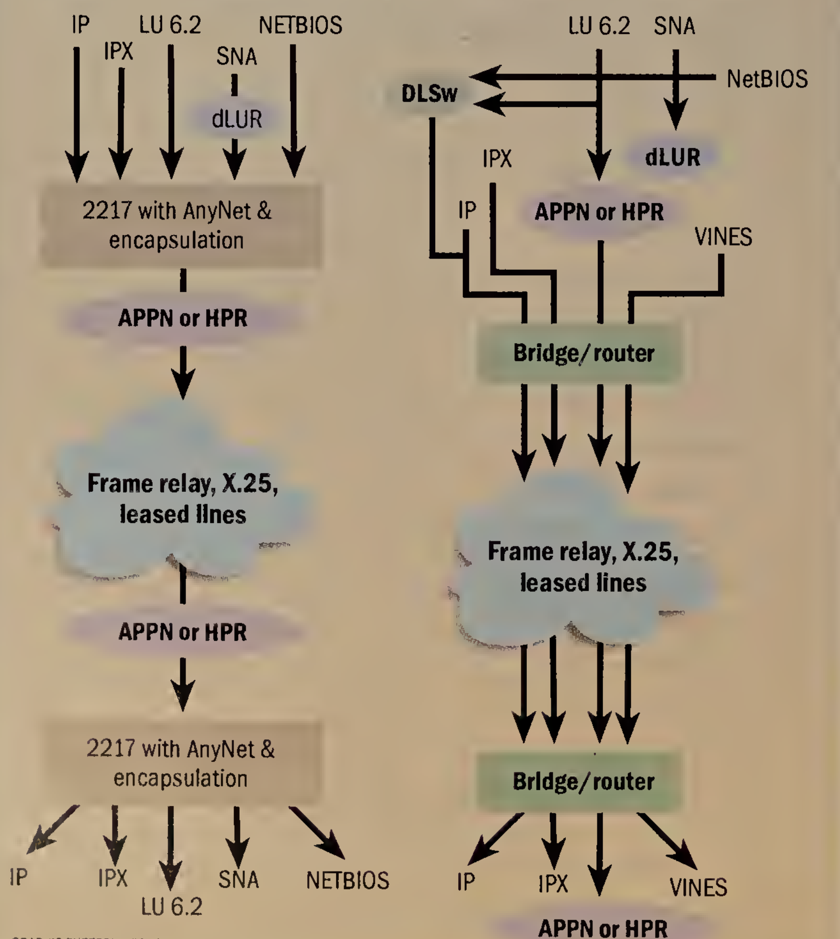
	Strengths:	Weaknesses:
APPN	▶ Routing across multiple mainframes or AS/400s based on SNA application name. ▶ Sophisticated path selection scheme with built-in transmission priorities. ▶ Automatic registration of End Node LUs. ▶ Can be used in a hybrid scheme with RFC 1490 or DLSw. ▶ Now available from multiple vendors.	▶ No dynamic alternate routing, although Bay Networks has a proprietary fix. ▶ Dependent on availability of dLUR. ▶ Not an industry standard ▶ Scalability could be an issue unless Border Node scheme is made readily available.
DLSw	▶ Can automatically locate destinations via MAC addresses (although not SNA names, as with APPN). ▶ Available from most, but not all, bridge/router vendors. ▶ Works across any WAN, not just frame relay.	▶ Very high overhead. ▶ Dynamic alternate routing cannot cope with failed central-site routers. ▶ May involve two-hop routing in networks with multiple IBM mainframes. ▶ No built-in traffic prioritization scheme. ▶ Only applies to SNA, APPN and NETBIOS traffic.
Frame Relay RFC 1490	▶ Widely adopted industry standard. ▶ Very low overhead, as little as one-quarter that of DLSw. ▶ Provides standard encapsulation scheme for all protocols, not just SNA/APPN. ▶ Can be customized to avoid packet discard to ensure consistent and predictable SNA/APPN response times.	▶ Currently restricted to frame relay networks. ▶ Best suited for mainframe-based networks.

Using IBM's AnyNet technology, a 2217 will convert IP traffic prior to entering the backbone. With this type of conversion, the addresses and information contained in the IP and TCP headers are mapped to SNA headers. The information portion of the IP message units are placed unchanged within the information section of the SNA LU 6.2 message units.

The 2217 does not use AnyNet conversion to support other non-SNA protocols. It supports IPX and NETBIOS traffic by encapsulating message units in their entirety, with all the original headers intact, within an LU 6.2 message unit. This is essentially the SNA equivalent of DLSw, which encapsulates SNA and NETBIOS traffic within IP. Other traffic, such as VINES, could theoretically be supported by the 2217, using SRB, provided the backbone is frame relay-based.

CHOOSE YOUR WEAPON

Comparison of the IBM 2217 APPN/HPR approach vs. bridge/routers.



GRAPHIC BY TERRI MITCHELL

The revenge of frame relay

The 2217 is targeted at two sets of customers, the first being SNA/APPN customers whose WAN traffic, even three to four years from now, is expected to be predominantly — say 80% or more — SNA. With the 2217, such customers will still have the ability to support some non-SNA protocols alongside the SNA traffic. It permits them to easily leverage their considerable investment and knowledge in SNA to encompass multiprotocol networking.

ONLINE

You'll find more information on APPN, as well as a copy of Gurugé's original "SNA Battle Royal" story, on Network World Fusion. Point your Web browser at http://www.nwfusion.com. After you log on (see page 5 for more info), select NetRef, Technology Resources and then Broadband.

Network World Fusion

The second set of 2217 customers, which is at best an optimistic target market, are those who believe that HPR will be the best overall data-only networking scheme.

HPR does have some persuasive features, including agile and very low-fat Layer 2 routing; dynamic alternate routing; state-of-the-art anticipatory congestion control; and elimination of intermediate node routing. That's in addition to all of APPN's strengths such as plug-and-play and COS support.

But most of these features are only available if one implements the entire backbone using HPR NNs — replete with some level of multiple paths between these nodes.

The HPR-centric networking scenario described above could lose much of its luster if frame relay, rather than HPR, is used as the backbone fabric, as is likely in most router-based nets. With frame relay dictating the attributes of the backbone, many HPR features become superfluous because they are also provided by the frame relay backbone.

As with HPR, many of the advantages of APPN can only be realized on a backbone that is also APPN-based, as opposed to frame relay-based. In addition, APPN and HPR will only excel if used in a network with many APPN End Nodes (EN) in which traffic is continually routed to multiple destinations, as opposed to back and forth to the same mainframe.

Most of today's mainframe-centric SNA networks will not meet these criteria. There will be a paucity of true APPN ENs, with most of the remote nodes being SNA nodes that require some level of dLUR support in order to communicate across the APPN network.

If a public frame relay network backbone is envisaged as the means for transitioning such SNA networks into multiprotocol nets, router- or 2217-based APPN/HPR routing may not be the best solution. If destinations are few in number and most of the nodes are SNA, RFC 1490

Continued on page 101

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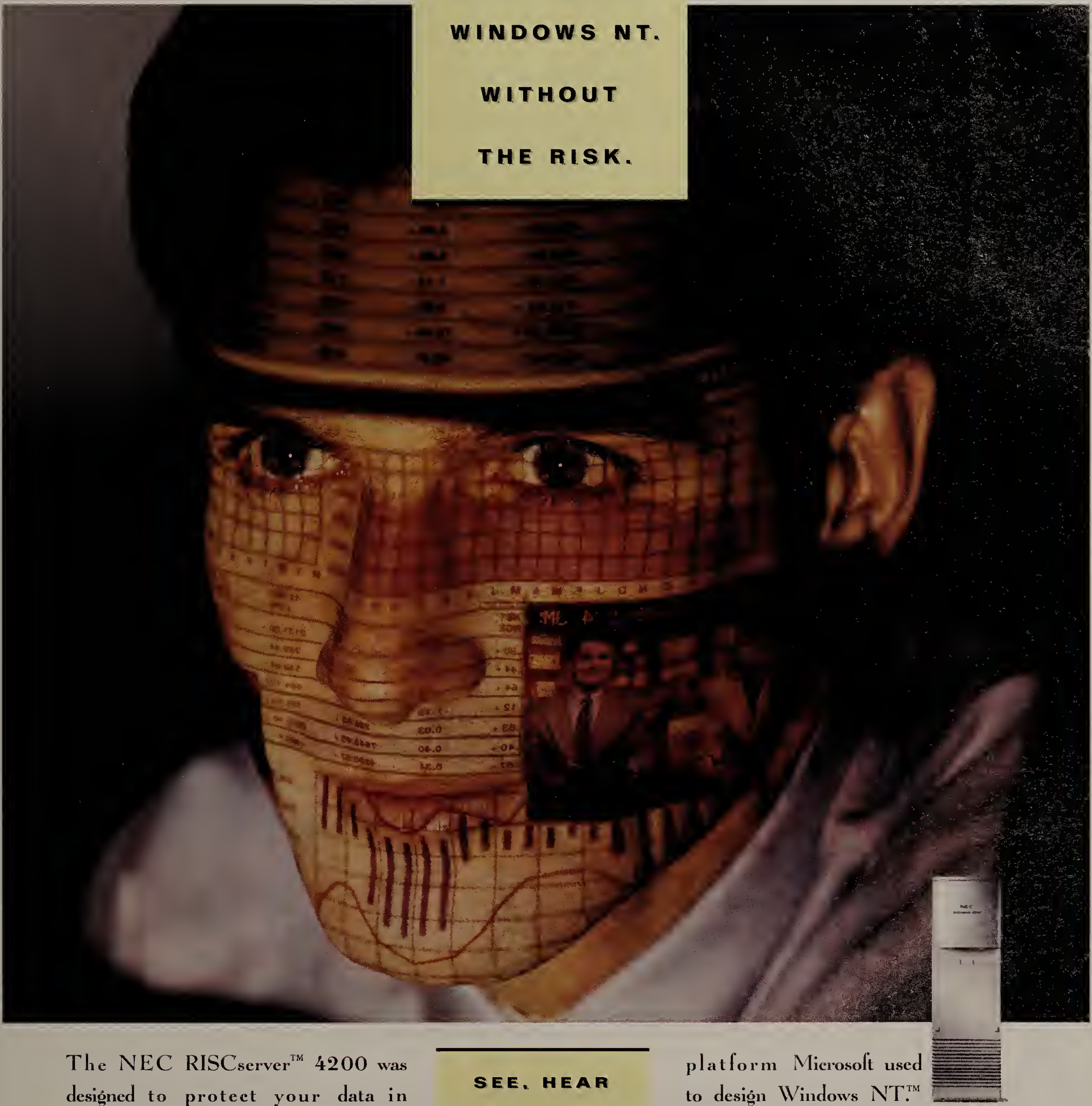

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first and then DLSw should take precedence over APPN.

No such thing as APPN traffic

APPN is a Layer 3 and 4, peer-to-peer networking scheme that provides end-to-end routing, directory services, configuration services, network topology update schemes and automatic resource registration facilities. APPN can therefore be viewed as a collection of services.

APPN does not, however, define any specific traffic types or message units. Instead, SNA LU 6.2 program-to-program traffic is the native traffic scheme supported by APPN, with other SNA traffic being supported via dLUR.

So, there is no such thing as APPN traffic. When people refer to APPN traffic, they are invariably referring to SNA LU 6.2 traffic. The same is true of HPR.

That makes for some intriguing relationships between APPN/HPR, DLSw and RFC 1490. For starters, both DLSw and RFC 1490 freely support LU 6.2 as well as all other SNA traffic types. Thus, "APPN/HPR traffic" — meaning LU 6.2 traffic flows — can always be supported across a DLSw or RFC 1490 network, without the need for the router involved to also be an APPN NN.

All the routes between the APPN nodes will be in the form of point-to-point connections, across the backbone, established using a destination MAC address-based bridging scheme.

This ability to freely support APPN/HPR across DLSw or RFC 1490 also leads to the possibility of networks where some routers support APPN NN routing while others do not. There can be some limitations in trying to support a series of APPN nodes across a network where the routers — or at least those at the edge of the network — are not providing APPN NN services. For starters, there will be no dynamic, COS-based APPN routing.

In addition, all the NN services required by the ENs — such as LU registration and remote LU location — will involve interactions across the network. If the routers were NNs, all such services could be done locally.

If this type of EN-to-NN interaction is likely to be common, as might be the case with a large AS/400 APPN network, it would be wise to consider an APPN NN-based router net — and if the SNA traffic is very high, possibly even a 2217-based solution.

APPN and RFC 1490 will again come together when routers are using APPN NN across a frame relay backbone. The routers will use RFC 1490 to transport all the APPN flows — whether they be con-

Continued on page 102

dLUR in a nutshell

Advanced Peer-to-Peer Networking is only capable of natively supporting Systems Network Architecture LU 6.2 sessions, also known as Advanced Program-to-Program Communications traffic.

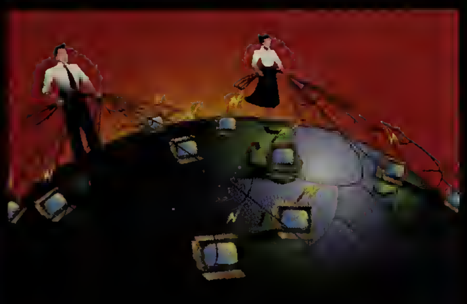
To support traditional SNA traffic, such as the more predominant SNA 3270, APPN requires an extension referred to as dependent LU Server/dependent LU Requestor (dLUS/dLUR).

The "dependent" part alludes to the fact that these LUs are totally dependent on mainframe VTAM services, including session setup and activation/deactivation.

In contrast, LU 6.2s can be configured to operate independently, without being beholden to mainframe VTAM.

Essentially, dLUS/dLUR is a client/server mechanism. Residing within VTAM on a mainframe is dLUS, and dLUR is either embedded within an SNA device, such as a 3174, or is implemented as a surrogate dLUR server in an APPN Network Node, providing dLUR functionality to SNA devices attached to that NN. The latter approach is taken by Cisco Systems, Inc. and Bay Networks, Inc.

VTAM 4.2 has had dLUS capability since mid-1994, but still a paucity of SNA devices implement dLUR — at present, only the IBM 3174 cluster controllers with Configuration Support C Release 5 microcode and PCs running OS/2 with the latest Communications Manager/2. The next release of CM/2 — expected to be available in November — is also slated to offer a surrogate server capability.



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trol flows, actual LU 6.2 data or SNA traffic being supported via dLUR.

This relationship between APPN and RFC 1490 is essentially the same as that between DLSw and RFC 1490. DLSw traffic, which is all IP-based, is transported across frame relay using RFC 1490 encapsulation.

Similarly, RFC 1490 could end up supporting LU 6.2-based "APPN traffic," regardless of whether that traffic is coming from an APPN NN.

APPN/HPR NN routing also shares many attributes with DLSw. They can both dynamically locate remote destinations and, thus, tend to be better suited than RFC 1490 for environments that have multiple destinations.

And like DLSw, APPN/HPR is also not a bona fide industry standard. The APPN, HPR and DLSw "standards" are all administered by the IBM-controlled APPN Implementors Workshop (AIW). In practice, that should not be a major stumbling block in the way of multivendor interoperability. SNA never was and apparently never will be a true standard.

What may be a problem is APPN broadcast searches and topology updates. Even though they only occur when there is a change in topology, as opposed to on a periodic basis as is the case with the IP Routing Information Protocol, the resulting overhead traffic can reach unmanageable and unbearable levels in a network with hundreds of NNs.

To circumvent the problem, APPN provides two separate solutions: Border Nodes and Central Directory Servers.

Border Nodes permit APPN networks to be partitioned into subnetworks so that topology update traffic can be restricted to a given partition, without restricting communications across partitions. The amount and scope of broadcast searches used to locate unknown destinations can be curtailed using the Central Directory Servers, which augment the cache directories maintained by each NN.

Today, Border Node implementations are only available on AS/400s and mainframes. The formal specification for Border Nodes, however, is not yet available from IBM — an example of the problems that other vendors experience when a so-called standard is not really a standard. Cisco, recognizing the need to partition large APPN networks, is actively working through the AIW to have the spec released. Cisco is hoping to offer Border Node capability by early next year.

A HEALTHY FOLLOWING

APPN has a considerable following in the AS/400 community, to the tune of around 12,000 networks. APPN is an integral component of the AS/400 operating system, and many key applications, including remote logon and file transfer, are supported as LU 6.2 applications over APPN.

It's also important to remember that, unlike DLSw and RFC 1490, APPN — at least outside the realm of the 2217 — is not an encapsulation scheme and, therefore, has no encapsulation overhead. RFC 1490, on the other hand, adds 16 bytes of overhead, while DLSw, when being used over frame relay, adds 66 bytes.

Bottom line

Before you place your protocol bets, here's how we are handicapping this competition.

In environments with few SNA/APPN destinations, DLSw or RFC 1490 has the edge over APPN. If in such cases frame relay would be used as the WAN backbone, RFC 1490 would likely turn out to be the more efficient and powerful means for integrating SNA/APPN traffic with other multiprotocol traffic. If, however, an IP-based backbone would be the WAN transport mechanism, DLSw would likely be a good option.

In networks with multiple SNA/APPN destinations, such as mainframes or AS/400s, APPN will typically offer a better solution than the other two techniques. With APPN, a router can perform dynamic routing to multiple destinations based on the SNA application name requested. This is a definite improvement over having no SNA-like routing in router networks.

With the likes of Cisco and Bay Networks behind it, this APPN stuff might actually add up to something after all.

Gurugé is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via the Internet at aguruge@mci-mail.com.

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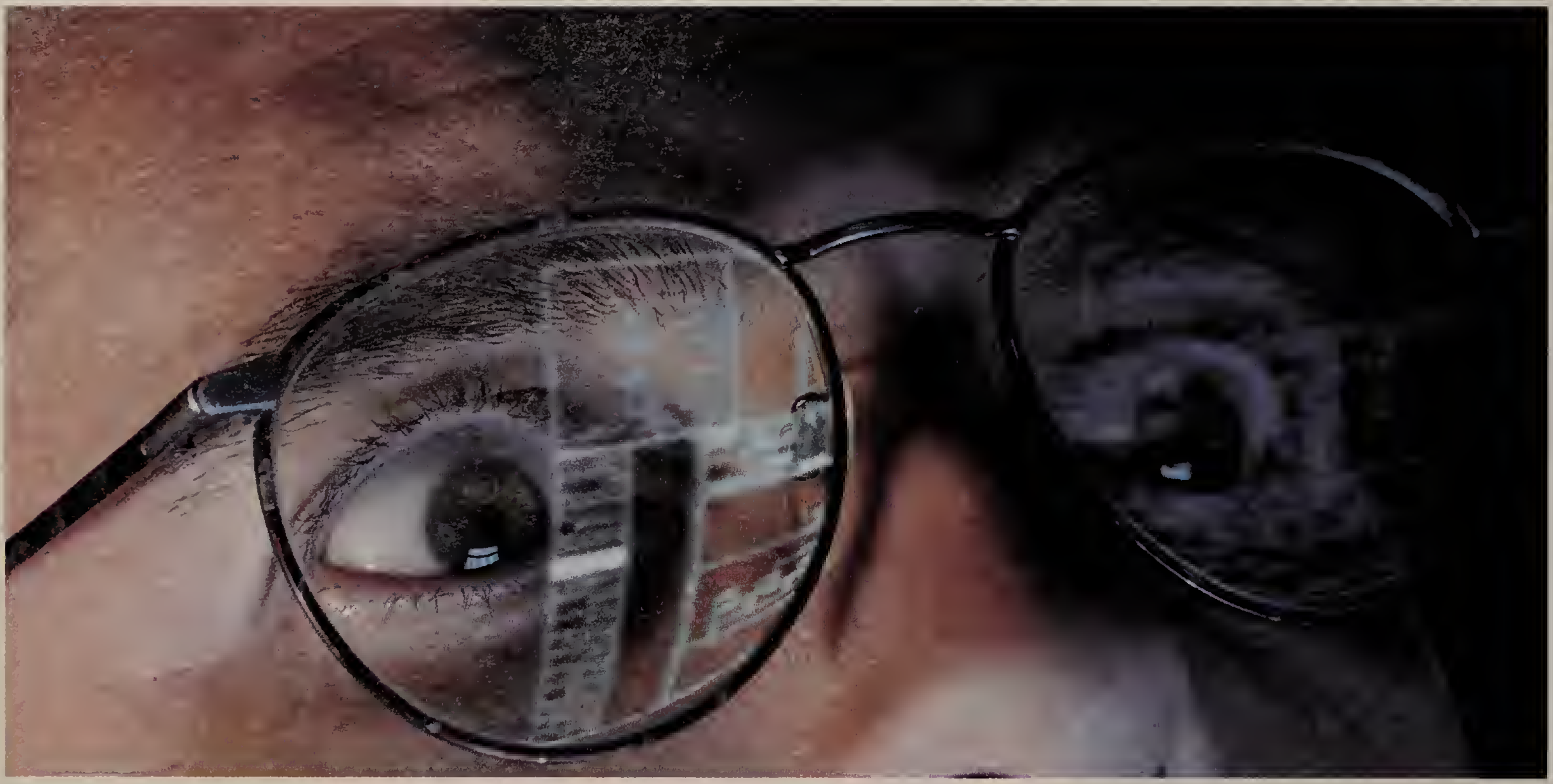

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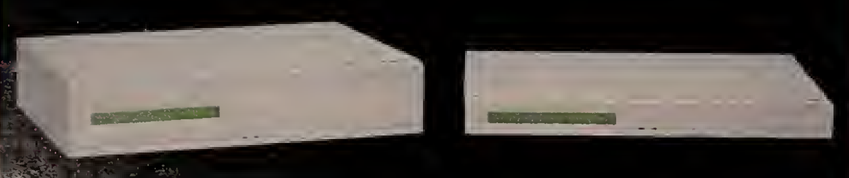

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Briefs

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AIT provides cross-training, seminars and certification courses for its members, 80% of which are from end-user organizations. Annual dues for five users in one organization total $375.

AIT: (516) 269-6713.

■ *The* **Business Continuity Group** *will hold its second annual* **Survive** *conference and exposition Nov. 1-3 in Philadelphia.*

The show will focus on many technical and nontechnical aspects of disaster recovery planning. A special set of sessions will address how to plan for recovering from a client/server computing network disaster. Special events include tours of nearby disaster recovery companies' hot sites.

Fees range from $375 to $1,195, depending on the number of workshops you sign up for.

Business Continuity Group: (215) 448-2000.

■ **MindQ Publishing, Inc.** *has released a CD-ROM package that helps increase end-user productivity when to those users access the Internet.* **The Internet: A Knowledge Odyssey** *has 10 interactive lessons that provide more than 90 minutes of audio and video instructions.*

Additionally, the CD-ROM enables users to access more than 100 simulated World-Wide Web sites where they can explore how to maneuver through pages of information and hyperlink to other sites without incurring online charges.

The CD-ROM requires an 80486-based PC running Windows 3.1 or better and is priced at $59.95.

MindQ Publishing: (703) 938-3579.

An acceptable-use policy can derail Internet distractions

Letting users know what's acceptable on the 'Net ups managers' faith in worker efficiency.

By Mark Gibbs

"The efficiency of most workers is beyond the control of management and depends more than has been supposed upon the willingness of men to do their best."

—Sumner Slichter

This renowned economist hit a nerve many years ago in pointing out that management had to exhibit faith in the ability of laborers to work efficiently.

Today, managers must show more faith than ever because computer and net tools make it easier for workers to get distracted. Furthermore, it's harder to detect when workers are using these high-tech tools for nonproductive purposes and harder still to control.

Regardless of how loosely or finely worded the AUP is, it should address two areas: responsibilities and behavior.

Put workers in front of a World-Wide Web browser and the novelty of it will enthrall them for hours, or even days. Turn people loose on the Internet and expect curiosity to draw them into everything from the rec.woodworking newsgroup to alt.sex.bondage.

When faith only goes so far, an effective method for reining in control is to institute an acceptable-use policy (AUP), which establishes what is OK to be doing on the company net and what's not.

Why an AUP?

If you don't define some reasonable and practical way for your staff to use the net and take responsibility for their actions, they may inadvertently do things that compromise the integrity or value of your communications services. Worse still, your legal recourse in going after individuals who intentionally disrupt operations is in doubt without an AUP.

Now one would think that such policies are commonplace in corporate America, but unfortunately, that is not so. An informal survey I conducted between May and July shows that managers at only 32% of 176 sites claimed to have an AUP in place. Of the remainder, 30% said that they were working on an AUP, and 38% admitted that they didn't have one at all.

Before you concoct an AUP, you need to decide whether you want your staff to interpret a set of broad principles or follow detailed instructions.

For example, the AUP can contain catch-all phrases such as "All use must be consistent with the purposes of our company." This kind of statement is only effective if the staff understands what those purposes actually are.

A detailed document with explicit rules can eliminate all possibility of doubt and misinterpretation, but you'll still need a catch-all phrase or two to cover everything you haven't been able to think of yet.

What to address

Regardless of how loosely or finely worded the AUP is, it should address two areas: responsibilities and behavior.

When addressing responsibilities, set out the general and specific issues your staff must be aware of to ensure that network integrity is maintained.

Included in this category are directives such as "If you become aware of a security violation or if you suspect one has or will occur, it is your responsibility to report it to management."

Behavioral issues define what employees are allowed to do with computers and networks. Will they be allowed to play games across the network or use electronic mail for other than business reasons?

Key elements of an acceptable-use policy

1 A definition of the role computers and networks should play in fulfilling the organization's mission.

2 A blanket statement that covers issues not otherwise specifically addressed. Example: "In the case of any doubt about the acceptability of any specific use or operation of the corporate network, contact management for clarification."

3 A reference to relevant documentation about disciplinary procedures that may be invoked when the policy is breached.

4 A stringent rule covering security issues such as password privacy, distribution of internal documents and labeling of confidential messages.

5 Behavioral guidelines that cover permissible uses of resources such as E-mail, acceptable message content and untolerated network activities, including any form of harassment, abuse or vulgarity.

6 Operational rules for using specific network applications, installing new software, downloading files from public sources and running virus checkers.

If games and nonbusiness use of E-mail are allowed, the policy should define what kinds of games and messages are acceptable.

Once you've created an AUP, you have to tell the employees about it and enforce it.

If the AUP is short and generalized, then simply circulating a memo may be adequate. If it is complex or detailed, you may want to hold briefing sessions for all staff.

As for enforcement, you have to decide what type of teeth you're going to put into the AUP and resolve to punish violators (see story, this page).

Not having an AUP eventually will become much more of a problem than having one. I would strongly suggest getting one in place now. Once you've created an AUP, you'll be more ready for wide-area operations.

Gibbs is a writer and consultant based in Ventura, Calif. If you have an AUP you'd be willing to share, please contact him via the Internet at mgibbs@gibbs.com or by phone at (800) 622-1108, Ext. 504.

Put some teeth into that policy

If you want an effective acceptable-use policy (AUP), you better be prepared to get tough in enforcing it.

For example, consider dismissing employees who introduce unsanctioned software onto corporate networks. While many people blanch at this apparently draconian position, such a step may be appropriate to prevent unapproved software from conflicting with mission-critical applications.

Furthermore, to signal your resolve to maintain top-notch security, you may want to take disciplinary action the first time an employee reveals his password to any unauthorized coworker or outsider, and you may want to summarily dismiss the person for a second offense.

Committing to take such volatile action begs the question of if and how you monitor staff activity to ensure AUP compliance. The tools are available to catch violators. There are utilities that search servers and workstations for games and other unwanted software. Other, more intrusive techniques, such as reading electronic mail or monitoring keystrokes, can also be used, but there are legal implications.

A book titled *Computer Crime, a Crimefighter's Handbook* by David Icove, Karl Seger and William VonStorch (O'Reilly and Associates, Inc., Sebastopol, Calif.) provides a good discussion of this whole issue.

Finally, it is vital that senior management supports the AUP. Even more crucially, senior managers have to prove they are bound by the AUP in the same manner as all other employees.

Without some teeth in enforcing an AUP, there's a real risk that your staff will believe they can get away with violations or simply not take the document seriously.

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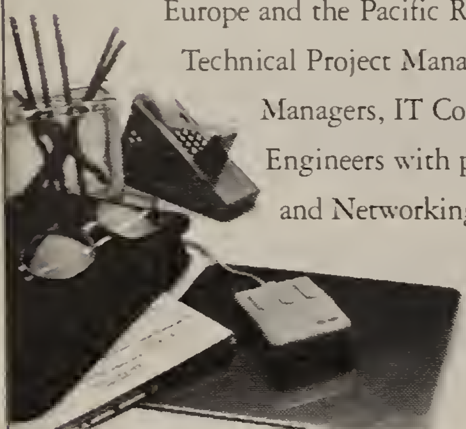

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FOR RESEARCH TRIANGLE PARK, NC POSITIONS, PLEASE SEND YOUR RESUME, INDICATING THE POSITION OF INTEREST, TO: CISCO SYSTEMS, INC., HUMAN RESOURCES, 7025 KIT CREEK RD., RESEARCH TRIANGLE PARK, NC 27709. FAX (919) 472-2961.

FOR BILLERICA, MA POSITIONS, PLEASE SEND YOUR RESUME, INDICATING THE POSITION OF INTEREST, TO: CISCO SYSTEMS, INC., HUMAN RESOURCES, 1100 TECHNOLOGY DRIVE, BILLERICA, MA 01821. FAX (508) 262-1785.

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CISCO SYSTEMS

General DataComm (GDC) is the leader in providing real business solutions for enterprise and telecommunications networks based on Asynchronous Transfer Mode (ATM) products and services. The company provides quality-engineered products and services to address sophisticated, evolving networking needs. Its extensive product line includes: ***ATM switches *Branch office solutions *Internetworking platform *Remote Access/V. fast modems and *Service and support.**

GDC serves corporate customers, government organizations, and public service providers worldwide. Founded in 1969, the company employs 1,800 people and had 1994 revenues of $210.9 million. The company is publicly held; stock is traded on the New York Stock Exchange. The following opportunities are available:

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R&D Engineers
Pre-Sales Engineers
Product Managers

SALES/MARKETING

Target Account Managers
Marketing Managers
District Sales Managers

As a key contributor to our success, you'll be rewarded with an outstanding compensation and benefits package that features 401(k) and Employee Stock Purchase Plan as well as ample opportunity for professional advancement. VISIT US AT INTEROP ATLANTA 95 or forward your resume and salary history to: Human Resources, General DataComm, Inc., 1579 Straits Turnpike, Middlebury, CT 06762, or call 203-574-1118. FAX: 203-598-7944. Principals Only. An Equal Opportunity Employer

General DataComm

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We look for people who welcome challenge.

Telematics International, Inc. is a leading international supplier of an integrated range of wide area network products and services for public and private work solutions including access, concentration and backbone switching applications. Telematics products are a reflection of the vitality of imagination. Driven by inquiring minds to simplify and refine complex network challenges, Telematics provides exceptional global networking solutions for today and the networks of tomorrow. We are looking for dynamic individuals who thrive on challenge, career satisfaction and growth.

OPPORTUNITIES IN FT. LAUDERDALE, FLORIDA:

PRINCIPAL S/W ENGINEER (Dept. 816) – Participate in system concept/behavior definition for ATM communication systems including partitioning system into H/W (including ASICs) and S/W; writing requirements and functional specifications. Develop high level models to validate behavior and performance of the system concept as it evolves. Manage verification and simulation of ASICs. Ten plus years S/W development experience in design verification/ system modeling in a UNIX/C++ environment. Development in a real-time communications environment. VHDL/Verilog a plus. Knowledge of ATM, packet switching, T1/E1, T3/E3, SONET, Ethernet, Token Ring and FDDI a plus.

SOFTWARE ENGINEER (Dept. 815) – Minimum of five years experience in the design and development of communications protocols and communications device drivers including "C" language coding; use of low level debugging tools including logic analyzer. Desirable experience factors are Frame Relay software development; UNIX development environment; Motorola 680x0 assembly language coding.

SOFTWARE ENGINEER (Dept. 868) – Ability to design and develop operating systems internals, embedded systems software and UNIX-based development tools. Knowledge of Motorola 680x0 assembly language coding, C language coding and use of low level debugging tools required. Communications protocols/networks; C++, redundant systems and multiprocessor systems experience is desirable.

COMMUNICATIONS TEST ENGINEER (Dept. 852) – Primary focus of this role is our programmable communications processor product line. Responsibilities include the acquisition of an in-depth understanding of the functional requirements of new hardware and software products; preparation of product test plans and specifications; establishment of test vehicles and the execution and/or supervision of integration level test of new products. Five+ years experience in the design, configuration and operation of wide area networks, In-depth knowledge of communications protocols (e.g., X.25, Frame Relay). Knowledge of software test methodology. Ability to develop, execute and supervise project plans.

Educational requirements include a BS or MS in Electronic Engineering, Computer Science or equivalent. Our extensive compensation and benefits package includes relocation assistance, incentive plans, immediate vesting in our 401(k) plan and medical and dental benefits effective on your start date. For confidential consideration, mail, fax or e-mail your resume to **Human Resources, 1201 Cypress Creek Road, Ft. Lauderdale, FL 33309. Be sure to reference the Dept# on your correspondence. Fax: (305) 351-4404. Internet: lucinda.blunt@telematics.com** EEO/AA Employer M/F/D/V.

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LAN PROJECT MANAGER

Analyze and recommend LAN solutions for our client hospitals and manage multiple implementations. Requires strong project management skills and a strong knowledge of hardware/software installation and configurations. Involves 70% domestic travel. **(Job Code: LANMGR)**

LAN SPECIALIST

Develop, support and serve as technical expert for LAN implementation at our client hospitals. Requires 4+ years' experience with network hardware/software installation and configurations, a knowledge of TCP/IP, Ethernet, Token Ring and FDDI as well as superior customer service skills. CNE preferred. Involves 60% domestic travel. **(Job Code: LAN)**

Your expertise will be rewarded with excellent benefits, a highly competitive salary and the opportunity to advance your career in an environment where promotion from within is the standard. For consideration, forward your resume to: **HBO & Company, Attn: (indicate approprlate job code), Recruiting, 301 Perimeter Center North, Atlanta, GA 30346. FAX: (404) 392-3050.** No phone calls or agencies, please. EOE M/F/D/V.

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You must be self-motivated and success-oriented, w/extensive hands-on field experience w/Novell NetWare and/or Lotus Notes; certified professionals preferred. Ideal candidates will also have experience in one or more of the following: Internet/UNIX, WANs, Powerbuilder, Delphi or Visual Basic. Must be willing to relocate to southern CT (near NYC).

Please send your resume and salary requirements to: nextage@pobox.com, or via Fax to 800.852.0650 no phone calls please!

NETWORK CONSULTANTS & SYSTEMS ENGINEERS

Computer Peripheral Resources, Inc. (CPR) is seeking qualified candidates for consultant and engineering positions in Boston, central CT, and NYC.

The selected candidates will:

- Consult with customers to understand the nature of their computing and networking needs and develop a comprehensive information systems plan.
- Design computing environments to support the needs of the customers' business. This includes LANs and WANs, workflow models, remote access methodologies, management and support strategies, and disaster recovery/business resumption plans.
- Provide training and second tier network support services to our customers.

Applicants must have: 6+ years experience in the design, implementation, and support of LANs and WANs; fluency in Windows NT Server, NetWare 3.x, NetWare 4.x, Windows, and OS/2 or Macintosh; a strong background in TCP/IP, IPX/SPX, NetBIOS, and 3270/5250 connectivity; Lotus Notes and/or MS Exchange experience; strong project management skills; excellent presentation skills.

For consideration, please send your resume and salary history to:

Computer Peripheral Resources, Inc.
Attn: Manager of Human Resources; PO Box 688; Natick, MA 01760
Fax # (508) 651-2688
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For More Information on Advertising in Networking Careers

Contact Pam Valentinas
1-800-622-1108

INTERNETWORKING PRODUCT DEVELOPMENT OPPORTUNITIES

AT&T Paradyne is currently seeking Software Developers with experience in LAN internetworking product development. Experience in developing C language software for bridges, routers or LAN interface cards with specific emphasis on IP, IPX, NETBIOS, PPP or frame relay protocols is necessary. Development experience in real time Micro Kernel environments is highly desirable.

Additional opportunities exist for Systems Engineers experienced in standards activities in the internetworking community and development of internetworking products (bridges and routers); and System Testers experienced in testing LAN internetworking products.

For immediate consideration, please forward a resume with salary history to: AT&T PARADYNE, Human Resources, Code CEN, P.O. Box 2826, Largo, FL 34649-2826, Fax (813) 530-2267. An equal opportunity employer, M/F/D/V.

AT&T Paradyne

TECHNICAL SUPPORT/ NETWORK ENGINEERS

Newbridge Networks Inc., a global leader in integrated voice and data networking products and network management systems, is currently seeking Technical Support and Network Engineers to provide support for product offerings in the high performance LAN/WAN connectivity market. We are looking for experienced, multitalented, and highly motivated individuals with a BS in technical discipline or equivalent industry experience. Candidates should have experience in one or more of the following areas:

- LAN Protocols and Mediums
- Multiplexing and Switching techniques
- Voice and Data interface standards
- SONET, DS-3, T1, E1 and DDS standards
- Multiprotocol routers and translation bridges
- Operating systems including Unix, NetWare, OS/2
- ATM, Frame relay, X.25, ISDN, HDLC
- Experience with Network Management platforms

Newbridge offers an exc comp and benes pkg as well as an exciting work environment. Please send resume and salary history in confidence to Newbridge Networks Inc., Human Resources, *Position # 96-PE*, 593 Herndon Parkway, Herndon, VA 22070-5241. FAX No. (703) 318-5114, *EOE, M/F, D/V.* No phone calls please. PRINCIPALS ONLY!

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These people will play a key role in building FORE Systems' Indirect channel business for its Ethernet Workgroup Switching products

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FAX: 412-635-3400, or
email to: resumes@fore.com

We are an Equal Opportunity Employer

Make your move to FORE Systems, Inc. Fore Systems is a leader in today's hottest networking technology with a comprehensive set of affordable ATM products. We continue to invest heavily in ATM technology and are introducing a wave of new products including those aimed at the PC and Macintosh markets. Now, we're seeking innovative individuals to move ahead with us, and set new trends in ATM.

FORE Systems is headquartered just outside Pittsburgh, PA — one of the most livable cities in America. This growing city boasts a renowned symphony, 3 major sports teams, and a host of well-respected colleges and universities, and is home to more than 300 software companies. In addition, Pittsburgh has a great cost of living, and offers easy access to some of the finest cultural and recreational resources on the East Coast.

FORE SYSTEMS

Software Engineers

Multiple positions in the areas of design, diagnostics, release, QA and network management. Must have experience with networking and C programming. Additional experience in one of the following areas:

- ■ Development management
- ■ UNIX device driver software and/or kernel development
- ■ ATM routing protocols
- ■ Network protocol development
- ■ Network management software (e.g., SNMP) and user interface development
- ■ Software testing, configuration management and/or quality control
- ■ Windows NT and/or Novell NetWare device driver software
- ■ MAC system software

Manufacturing Opportunities

Many openings exist at all levels for seasoned professionals.

Hardware Engineers

Multiple positions in the areas of diagnostics, design and testing. Must have experience in designing and testing computer or network hardware. Additional experience in one of the following areas:

- ■ Development management
- ■ Digital/analog design
- ■ ASIC development & VHDL
- ■ Design of hot swappable boards, power supplies & MTBF calculations
- ■ Familiarity with FPGA/gate-array design
- ■ Developing testing and diagnostics software (UNIX & C required)

Systems Analyst: Customize software for a financial management accounting package and other packages using SQL*Plus and Oracle 7.0 database tools; document applications, upgrade software, establish procedures and guidelines; assist in installation and maintenance of a Novell Netware System and peripherals, train end users in use of system applications and software. Position requires B.S. in Computer Science or Electronics Engineering including use of SQL*Plus and Oracle database tools, and installation of Novell network. 37.5 hrs/wk; 8 a.m.-4:30 p.m.; salary of $29,825.00/yr. Send resume with Social Security # to Indiana Department of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204-2277, Attn: Gene R. Replogle. Include ID #3379560 with response. Must be eligible for permanent employment in the U.S.

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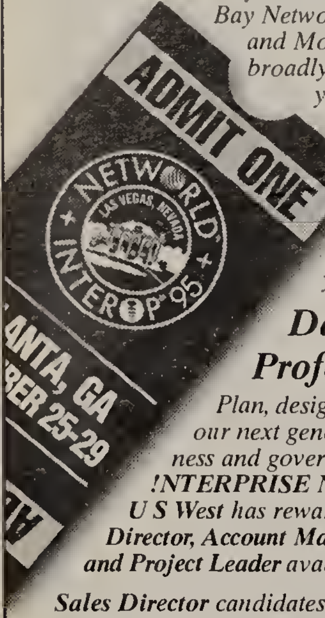
The Networking Careers On-line Bulletin Board System will now be on Network World Fusion, @ http://www.nwfusion.com, Network World's new World Wide Web offering. Network World Fusion is the most comprehensive and educational advertising environment on the WWW. Your recruitment print ad will be placed on **Network World Fusion for 4 weeks - free of charge.**

Network World Fusion replaces The Networking Careers On-line Bulletin Board System. For more information on your Network Fusion options call Pam Valentinas at (800) 622-1108.

HERE'S YOUR *ticket to our* INTERVIEW



Already the leader in LAN/WAN integration and local frame relay services, ***U S WEST*** *offers Transparent LAN Services to connect Ethernet or Token Ring LANs at native LAN speed, along with state-of-the-art hardware from Cisco, Bay Networks, NetFRAME, Novell and Motorola. We also have broadly available ATM. So, if you're going to InterOp, come on by and learn more about our opportunities nationwide. See if our vision aligns with where you're steering your career.*

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Sales Director *candidates should have a 5 year proven track record managing sales and technical people in the data networking industry.*

Account Manager and Systems Engineer *candidates should have significant sales and technical design experience in systems and network integration. Experience will include all WAN technologies and LAN hardware, such as routers, hubs, DSU/CSU, etc. Knowledge of frame relay, SONET, TCP/IP, IPX, etc. is also desired.*

Project Leader *candidates should have hands-on experience implementing the above technologies, complemented by troubleshooting skills with diagnostic tools such as a protocol analyzer.*

So, bring your resume and join us at Networld + InterOp '95 at our Hospitality Suite Monday, Tuesday & Wednesday, 9/25, 9/26 & 9/27, 5PM-8PM, Omni Hotel, CNN Center, Atlanta. *Concierge Desk will advise you of the suite number.*

If unable to make it to Networld+InterOp '95, FAX your resume to National Recruiting Manager at (503) 425-5394; or e-mail: ameeker@acs.uswest.com. For more information about these and other data networking opportunities, see us on the web: ***http://www.careermosaic.com/cm/uswest/home.html*** *An equal opportunity employer.*

!NTERPRISE
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InterGlobe Networks, the Northwest's leading provider of TCP/IP network solutions and services, seeks experienced, high-energy, creative individuals to enhance its team of consulting network engineers. We provide you with exceptional professional opportunities, aggressive compensation packages, a playfully relaxed, but hard working environment and the ability to enjoy Seattle and surrounding areas.

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inter Globe™ Networks

For a more complete position description, see our WWW page at http://www.interglobe.com or send e-mail to 'search@interglobe.com'. To apply, send your cover letter, resume, and a list of three references via e-mail to 'search@interglobe.com' or to:

interGlobe Networks, Engineer Search
1520 Fourth Avenue, Suite 200, Seattle, WA 98101

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NETWORKING SALES

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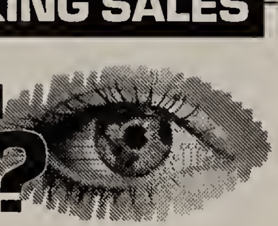

At MAXNET, our vision encompasses an in-depth understanding of today's multivendor enterprise networks, and recognizes opportunities for emerging technologies. We continually find new ways to improve upon existing ideas, and develop creative solutions for network challenges. Our entrepreneurial spirit, progressive work environment and love for technology enabled us to become one of the fastest-growing network integrators in the United States.

Due to our rapid expansion, we are seeking enthusiastic professionals for our **offices throughout the United States** including: **North & South Florida, New York/New Jersey/Connecticut, Atlanta, Charlotte and Greensboro.** If you've got a competitive edge and share in our vision, we'd like to set our sights on you. The following sales positions require excellent written and verbal communication skills.

NETWORKING SALES

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MAXNET offers top compensation, where Salespeople earn considerably more than the industry average. Qualified applicants, please send your resume to our Corporate Headquarters located at: **1915A Hollywood Blvd., Dept. NW-EY, Hollywood, FL 33020,** e-mail to: **hrevaz@4maxnet.com**, or fax to: **(305) 926-6683.** E/O/E.

MAXNET
communication systems, Inc.
Solutions for network integration

For more information on MAXNET and the latest opportunities throughout the U.S., visit us in the ***Marketplace*** *under* ***Direct Connect***, *at* ***http://www.nwfusion.com.***

Information Systems Consultant (DOT Code 030.167-014): Analyze, design, program, test, and maintain Financial Accounting Information System (FAIM) modules using a customized Walker General package. Hardware used is IBM 3090 mainframe with MVS operating system. Position requires bachelor's degree in Mechanical or Electrical Engineering or Computer Science and two years prior experience as a Programmer or Systems Analyst including experience developing accounting information systems on an IBM 3090 mainframe and using Assembler programming language, CISC, DB2, and INTERTEST debugging tool. 40 hrs/wk; 8:00 a.m.-5:00 p.m.; salary of $41,800.00/yr. Apply to nearest office of the North Carolina Job Service or submit resume to Job Service, 700 Wade Avenue, P.O. Box 27227, Raleigh, NC 27611. Include Social Security No. with resume and identify that resume is in response to Job Order #NC7251421. Applicants must be eligible for permanent employment in the United States.

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- **TECHNICAL SPECIALIST – COMPLEX DATA AND VIDEO SERVICES**

Successful candidates must provide ongoing technical support for both presale and postsale activities, and high level technical support for complex local exchange carrier data networking services in areas such as ATM, Frame Relay, Packet Switching, and ISDN. You will assist in development of appropriate solutions to client data communication and video service issues, update account teams on major local exchange data and video services, competitive, and industry developments, and deliver customer product/application briefings and assist in proposal preparation. Customer contact skills and extensive experience with data service is required.

Four year technical degree preferred.
Excellent presentation skills necessary.

Cincinnati Bell offers excellent pay, competitive benefits and relocation assistance.

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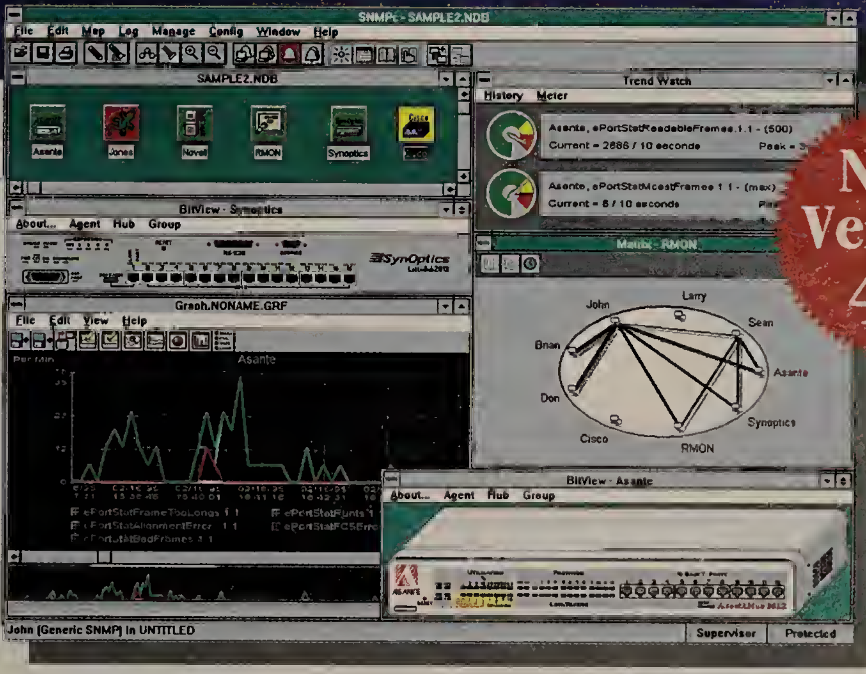

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100 Base-TX Fast Ethernet Hubs

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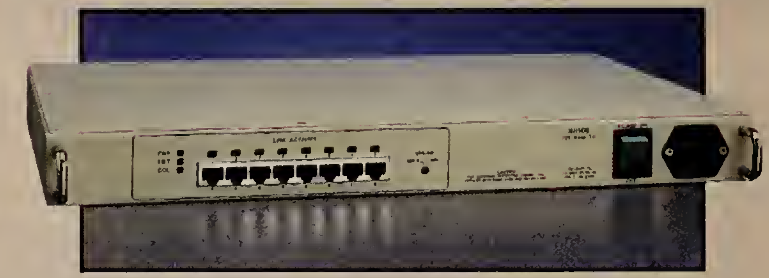

100Base-TX 8-Port Hub (NH 108)	$1,250

Networth

100Base-TX8-Port Hub (MICRO 100)	$1,195

SMC

SMC5116TX Tiger Hub 100 16-Port 100Base-TX Hub	$2,997

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100BASE-TX 12-Port Stackable Hub	$1,675

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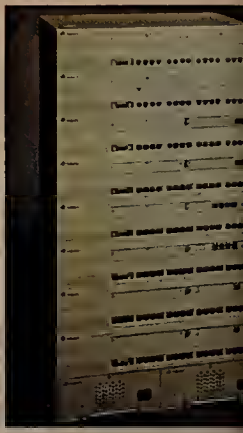

PROStack EtherSwitch stackable Ethernet Switch, 16 RJ45, 2 expansion slots for high-speed modules (10Base-TX/ATM) (PSP16-M001)	$6,370
(PSP16-M041)	$7,095
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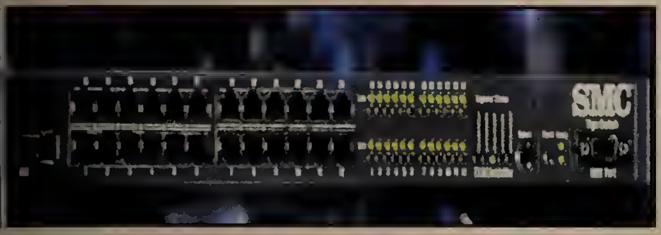

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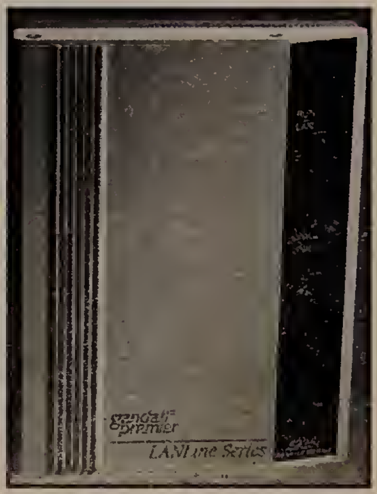

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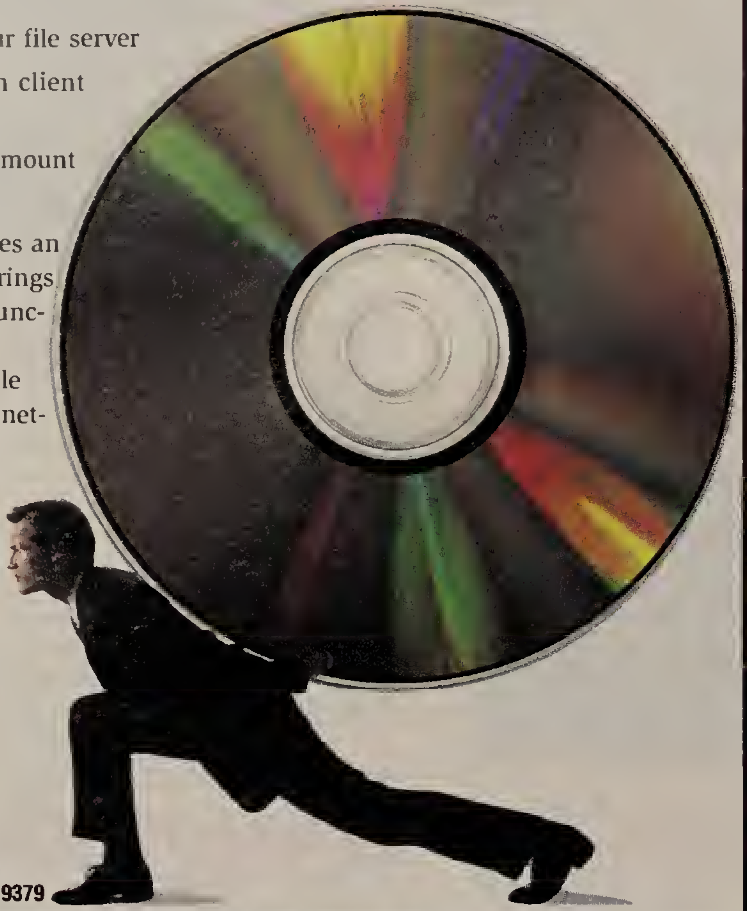

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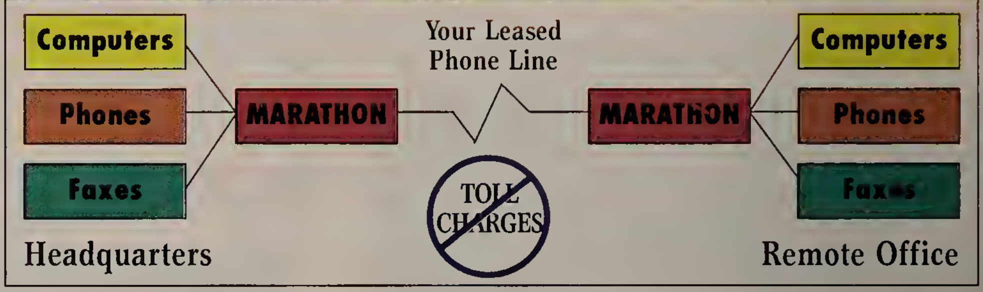

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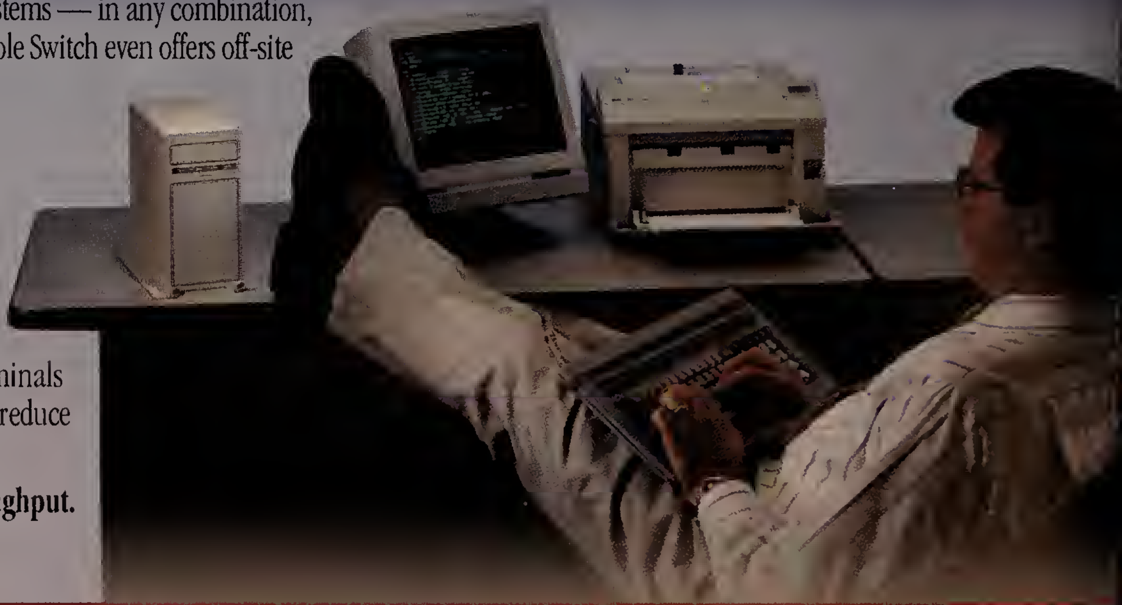

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New Frontier Technologies Internet Software Allows Offline Search

By ANN KRAUSS

Frontier Technologies, developer of award-winning TCP/IP applications, announced the release of a unique new Internet software product for Microsoft Windows-based systems, SuperHighway Access CyberSearch™. This CD-ROM product features Frontier's popular SuperHighway Access Internet browser, integrated with a huge database of Internet resources which can be searched off-line, thereby reducing on-line charges and increasing productivity. The database is Lycos™, developed by Carnegie Mellon University, which is widely accepted as the most extensive catalog of Internet resources.

Frontier Technologies' SuperHighway Access CyberSearch will be produced monthly (bi-monthly initially), to reflect the rapidly-expanding array of information available on the Internet. Subscribers will pay as little as $6.75 per month. Each CD will contain a newly compiled version of Lycos, covering over 500,000 Internet pages indexed by keyword. Users can browse off-line for sites of interest and assemble a file of Internet resources using SuperHighway Access's sophisticated Internet Organizer. Then, once connected to the Internet, users can launch multiple searches at once, and be reviewing or downloading information from one site while connecting to another.

"It is now widely understood that one of the primary barriers to user productivity on the Internet is finding information," said Dr. Prakash Ambegaonkar, president of Frontier Technologies. "That's why Internet search services like Lycos and Yahoo™ are among the Internet's most popular sites. As a result of their popularity, these services can be frustratingly congested and slow. By putting the Lycos catalog on a CD, users will be able to reliably and quickly locate the Internet resources they need before they even connect to the Net."

SuperHighway Access CyberSearch will work with the user's current Internet service provider, or new Internet users can establish an account via convenient autoregistration with PSINet's Instant InterRamp, a national Internet service provider. PSINet is offering CyberSearch users a free 7-day trial account, with the option to register permanently at the end of that time.

CyberSearch targeted at both business user and consumer

SuperHighway Access CyberSearch is suitable for both business and home use. It provides all the connectivity software required for home users to connect to the Internet via modem and will also run on an existing corporate TCP/IP local area network. By first pinpointing the sites they need to visit, using CyberSearch, employees can rapidly gather competitive information or market research.

Pricing and Availability

SuperHighway Access CyberSearch is available immediately. Frontier Technologies intends to market the product through retail channels and through subscription. The current product has a September 1995 cover date and is specially priced at $14.95. Frontier intends to provide bi-monthly issues initially and anticipates moving to monthly publication in January 1996. Two subscription choices are available: an open-ended "no-hassle" subscription at $6.95 plus $3 shipping and handling, billed per issue (credit card customers only), and a 6-issue charter subscription offer for $58.50 ($6.75 plus $3 s/h per issue). To subscribe with either plan, or to order an introductory trial issue, customers should call 1-800-879-0075. (Outside the U.S., please call +1-414-571-0190.) Further information is also available on Frontier Technologies World Wide Web site, www.frontiertech.com.

Frontier Technologies, founded in 1983, is a global company with headquarters near Milwaukee, Wisconsin. With offices in California, Pennsylvania, Europe, and India, Frontier Technologies now employs more than 100 people worldwide. ■

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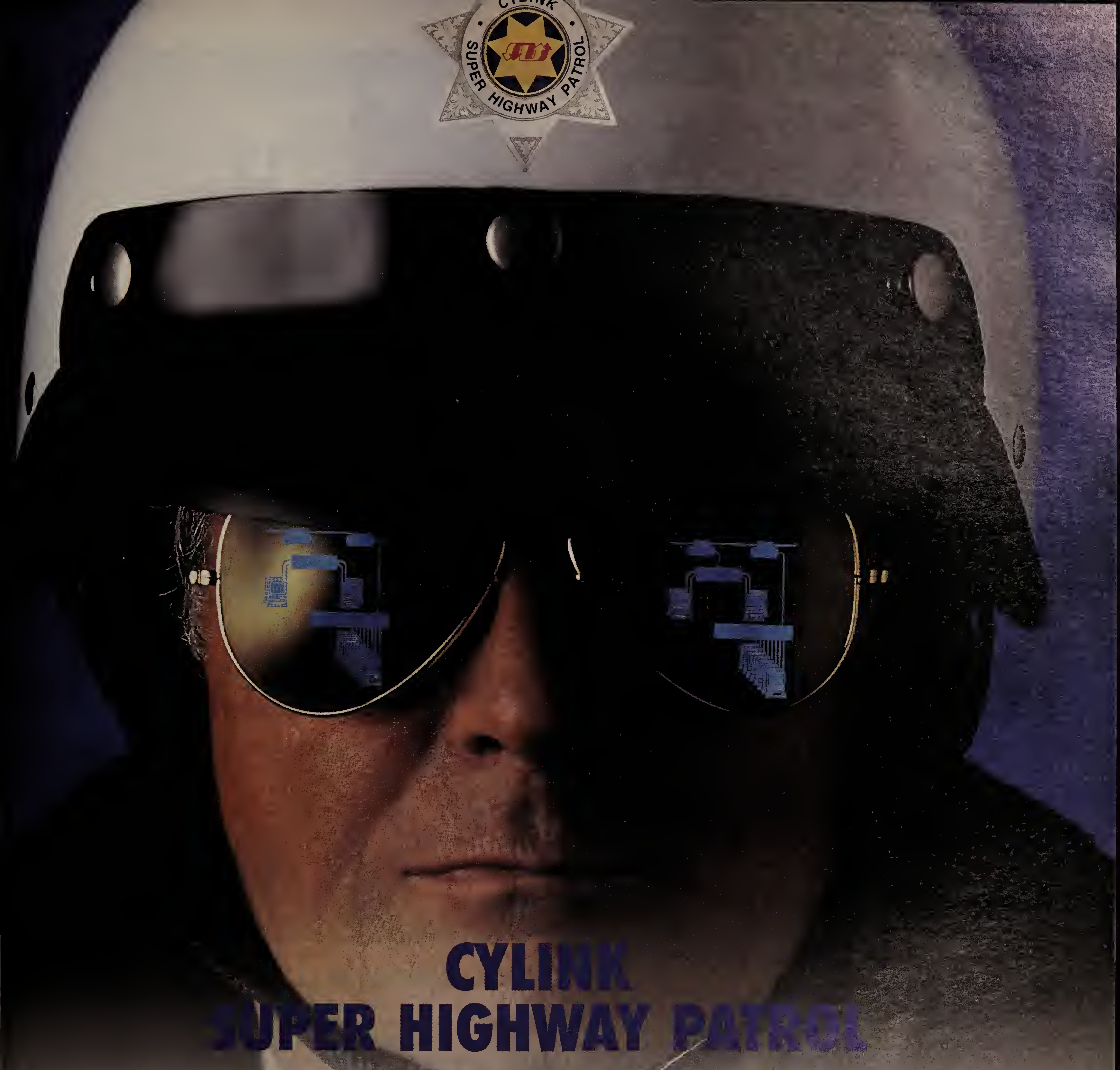

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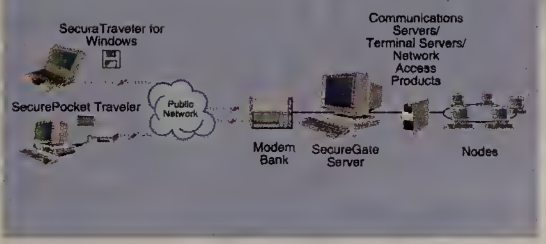
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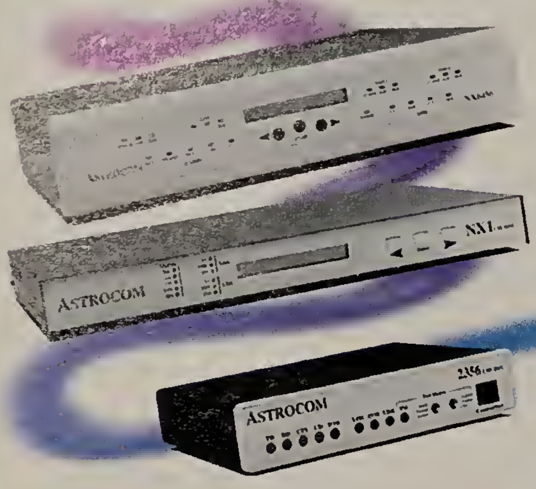

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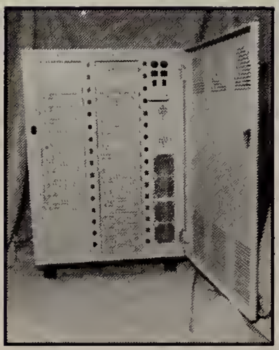

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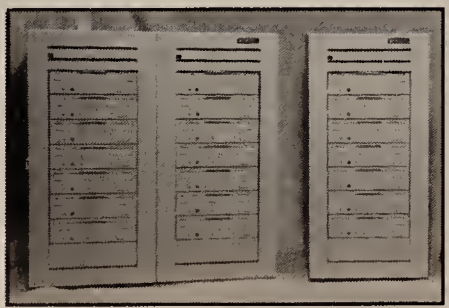

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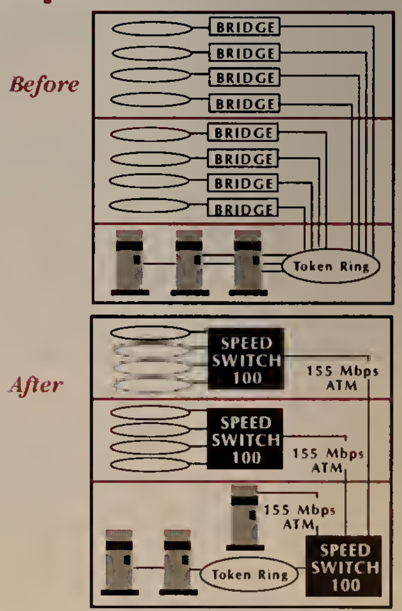

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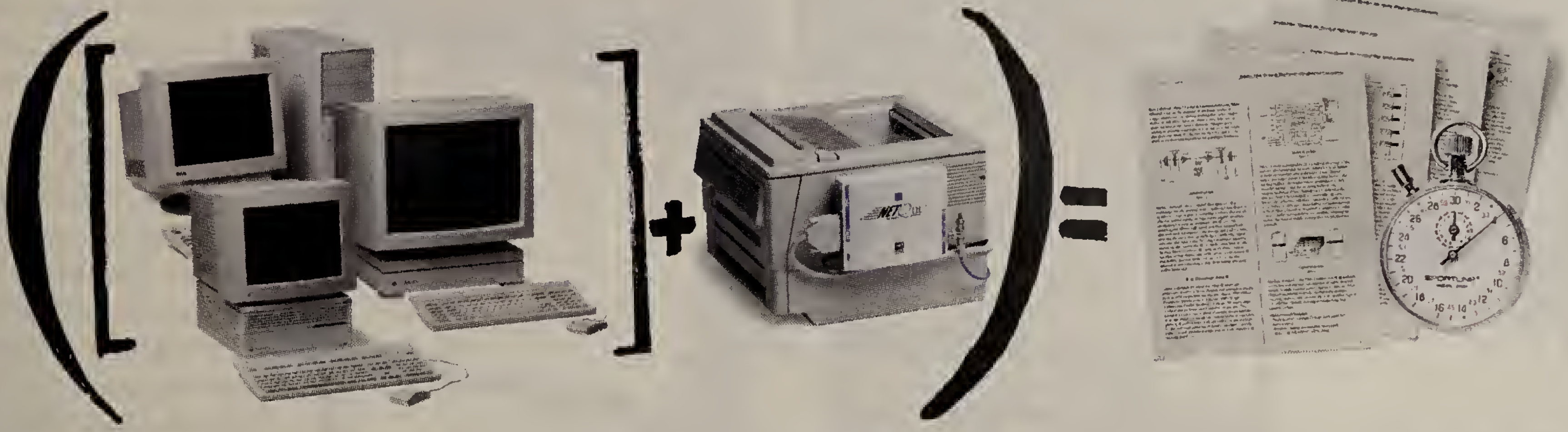

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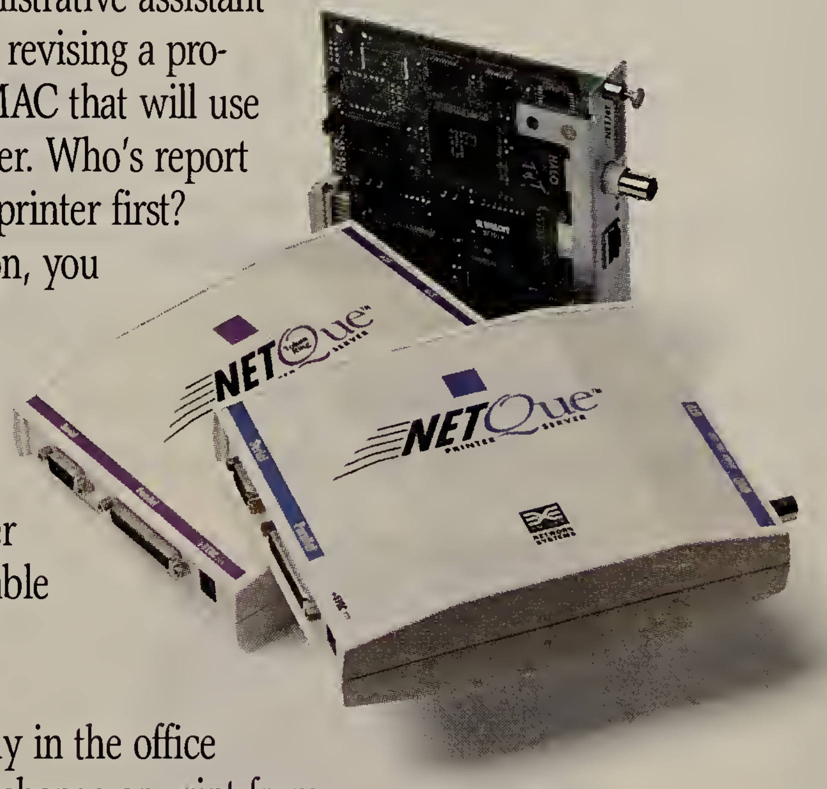

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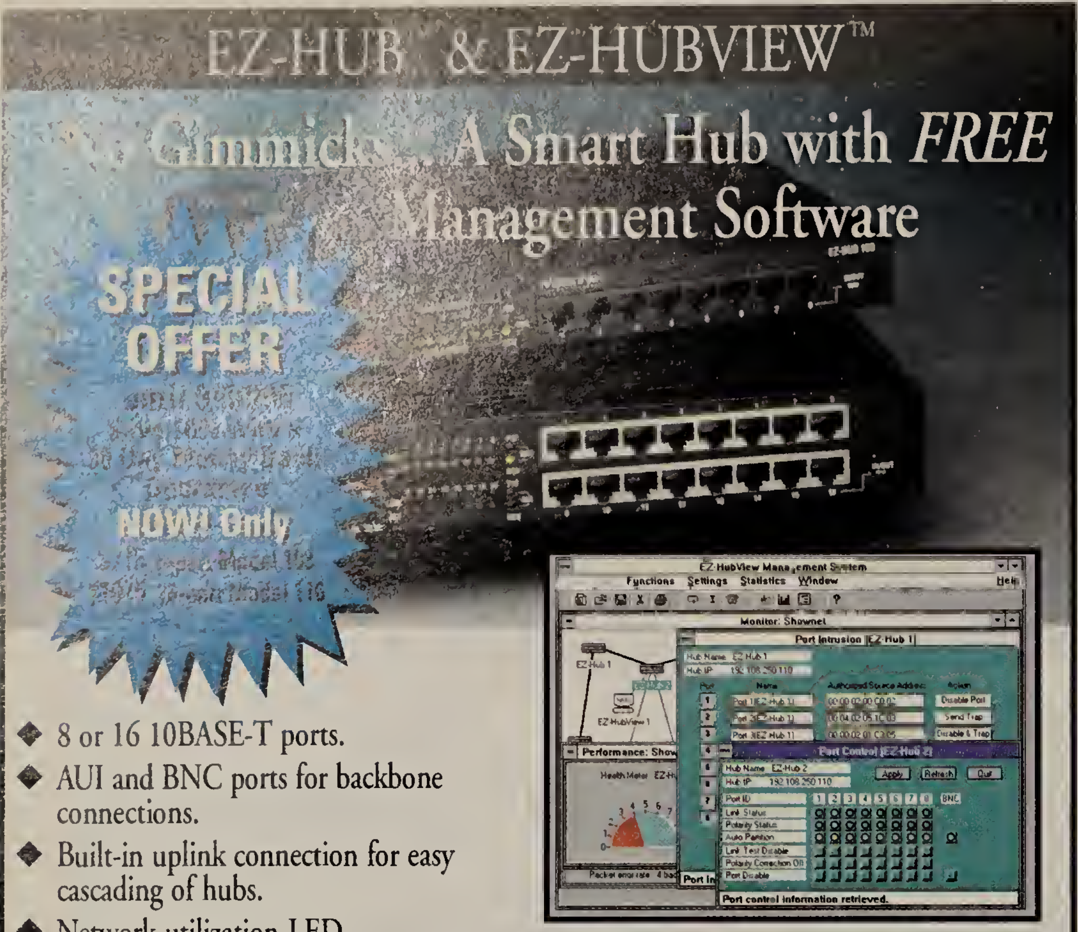
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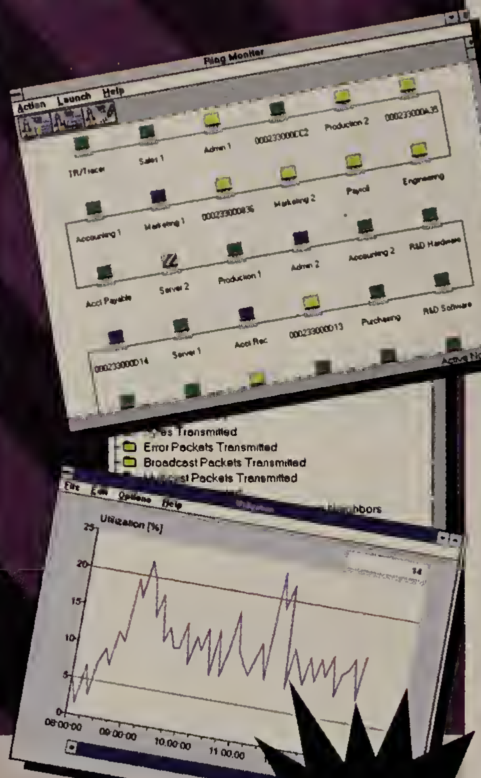

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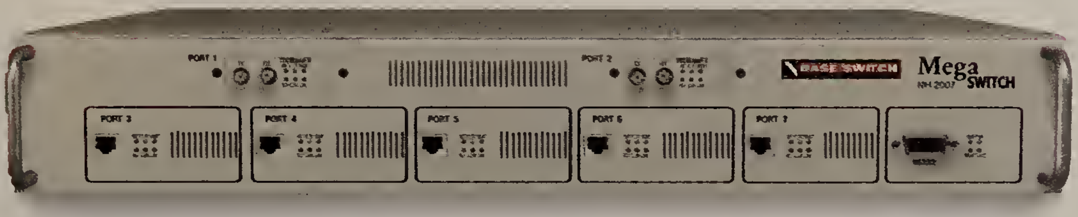

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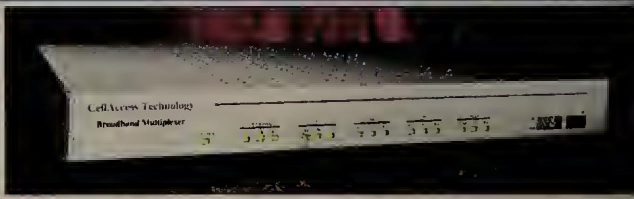

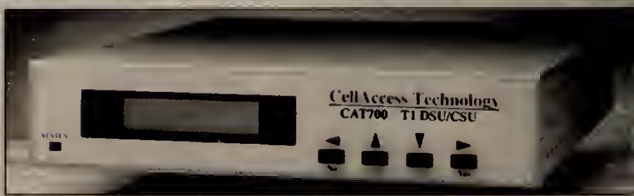

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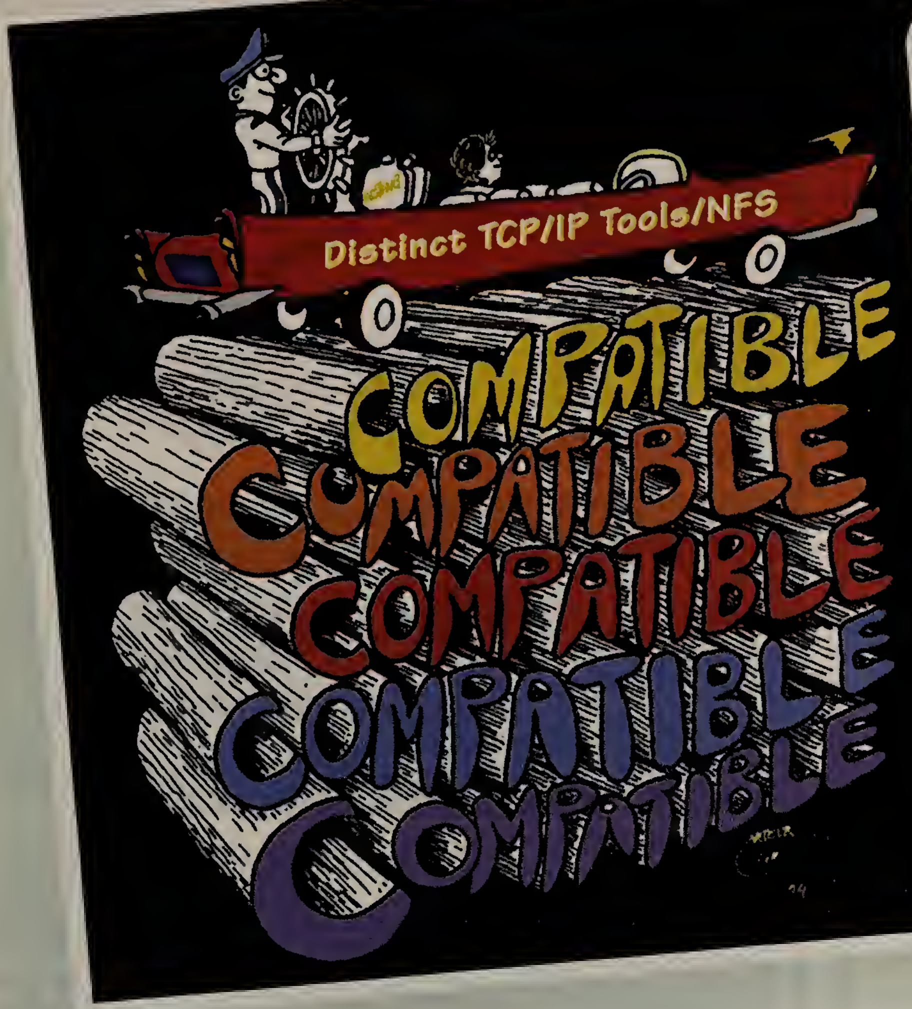

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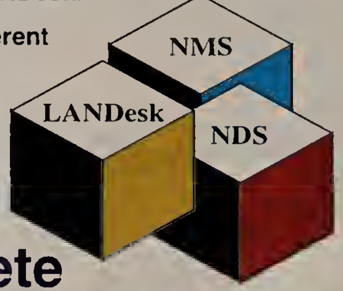

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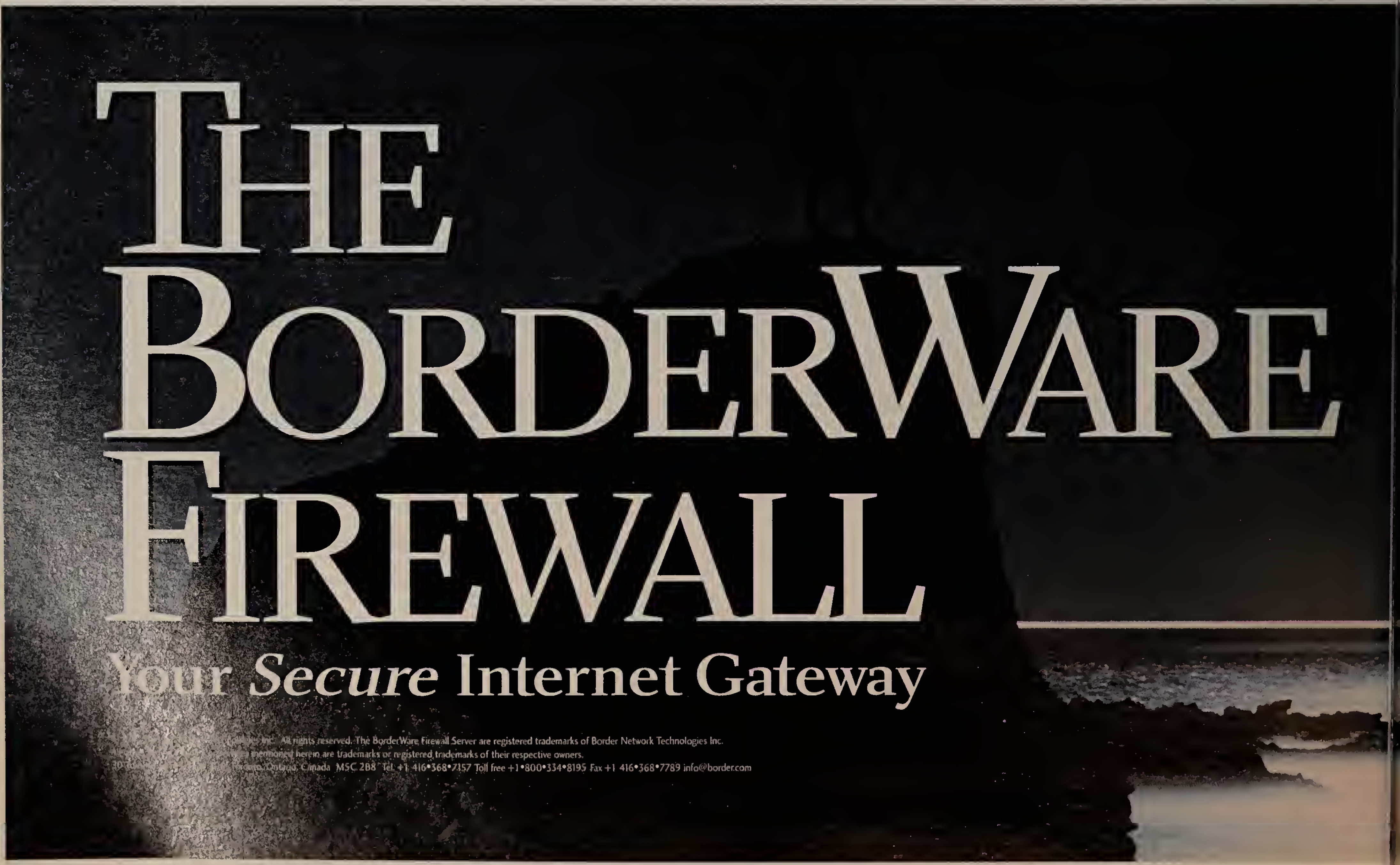

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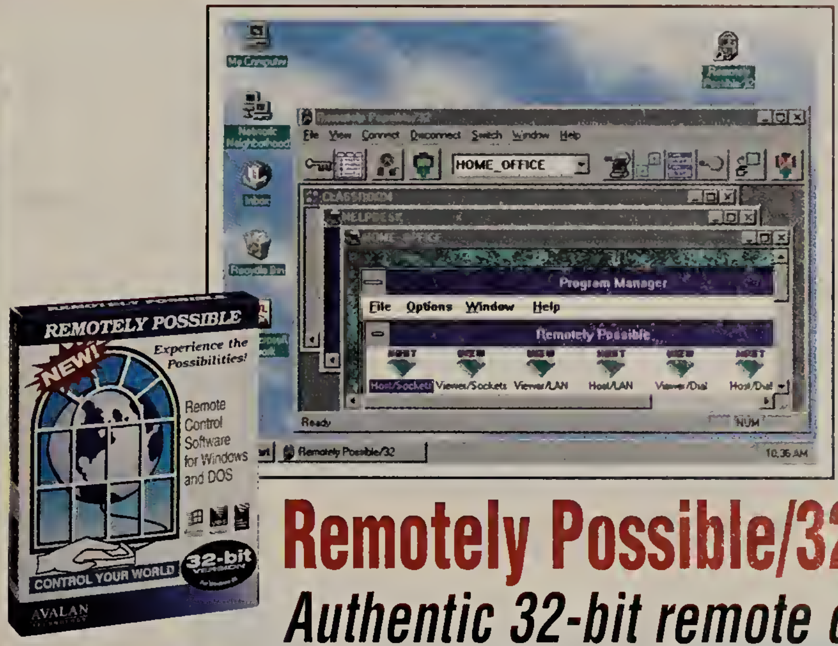

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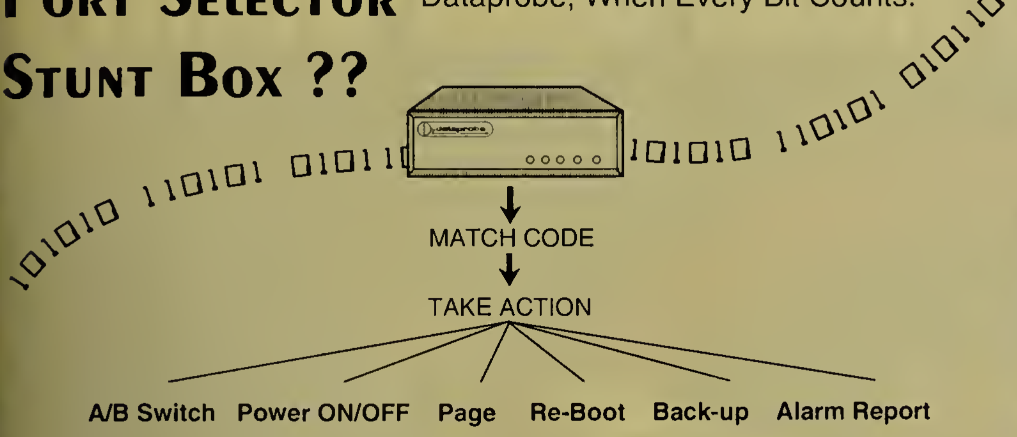

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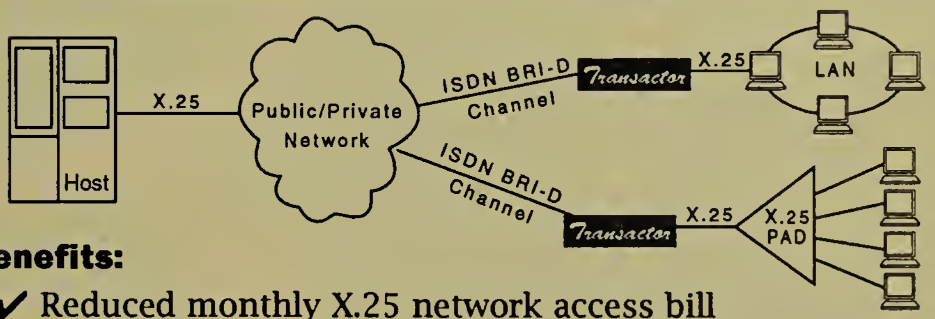

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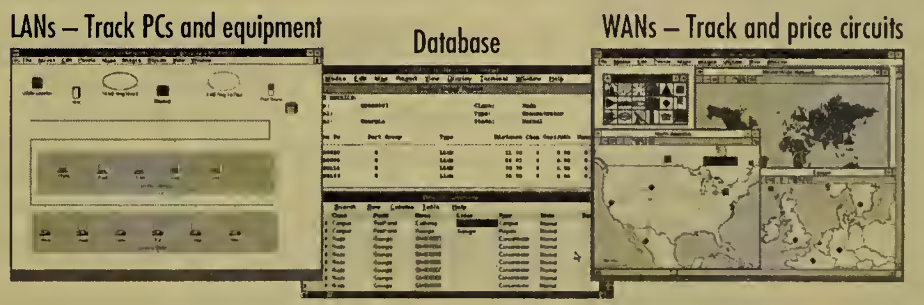
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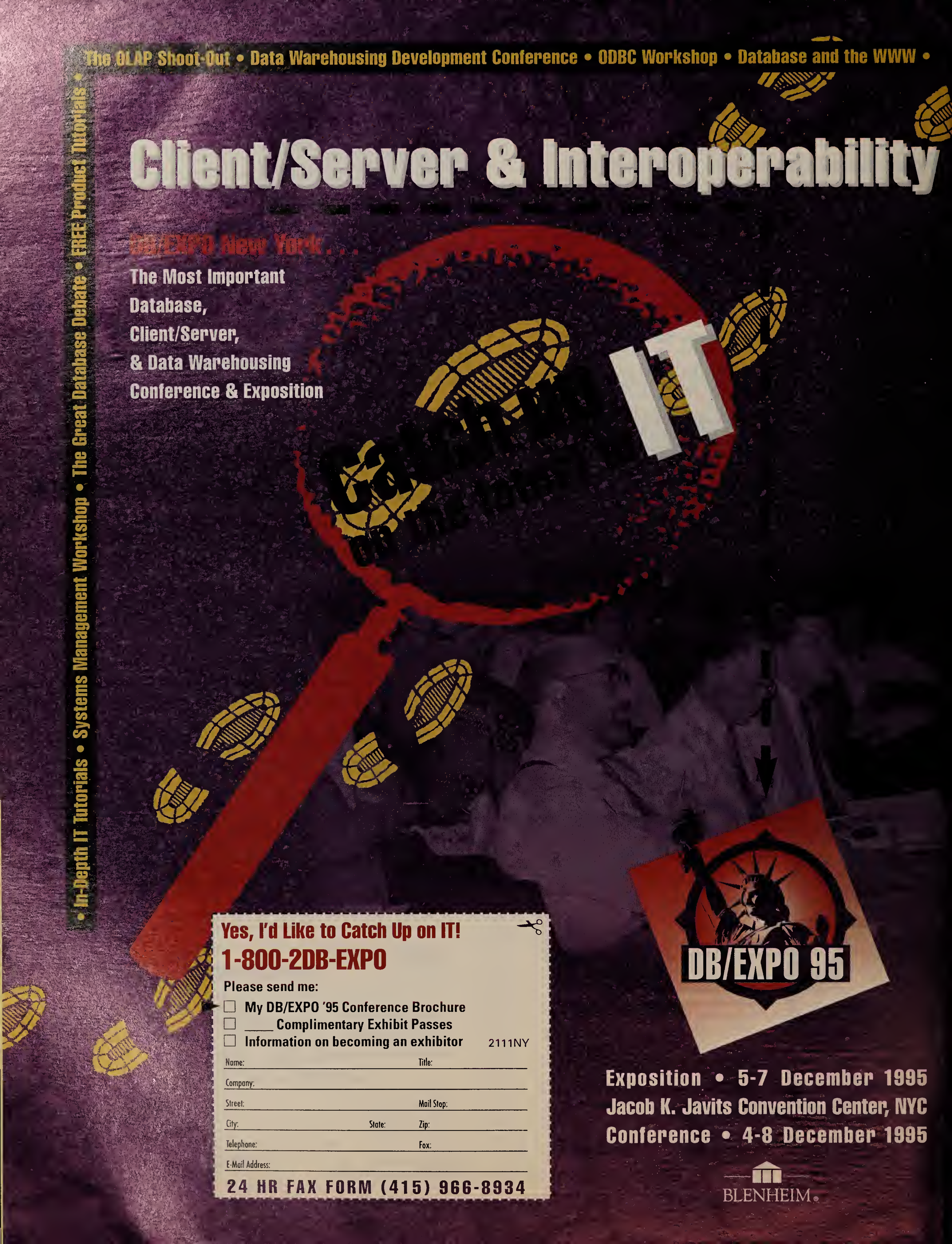

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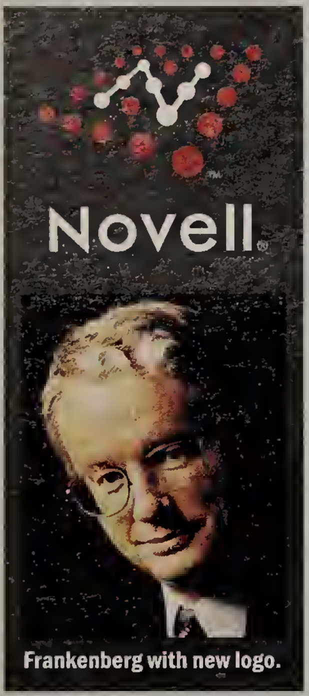
Novell aims to link heterogeneous nets

Novell, Inc. last week promised a return to its roots, committing to be the premier provider of products for linking multiple software and hardware platforms into heterogeneous networks.

As expected, the company will de-emphasize its efforts in the application server market that Microsoft Corp. is aggressively going after, while strengthening its core directory, security, management and other network services (*NW*, Sept. 4, page 1).

"This strategy delivers significant value in areas Microsoft doesn't want to pursue or can't pursue," said Robert Frankenberg, Novell's president and chief executive officer, at a press conference in New York. "Heterogeneous networks are anathema to Microsoft."



Frankenberg with new logo.

Key to the integration strategy is NET2000, a set of APIs and development tools due next year that will provide an easy way for software vendors to give their products access to NetWare services such as NetWare Directory Services, Frankenberg said. "This delivers a standard way to access network services regardless of your client or server," he said.

Novell is counting on NetWare Connect Services (NCS), the public network it is building with AT&T and other carriers, to link corporate networks to one another. The public net will be accessible by users and smart devices over traditional networks as well as via cable television wires, electronic power lines and wireless links.

Novell also will continue to enhance NetWare, making its services more scalable and flexible. In 1996, the company will improve the NetWare storage and print services, and add support for X.500, remote network management through NCS and software distribution.

In 1997, Novell will enhance NetWare's file services. It will also add a transactional service based on its Tuxedo technology as well as clustered processor support, load balancing and memory protection.

Novell

Continued from page 1

lenge Microsoft like Novell has, so they have a chance," said Fred Wilson, network systems administrator and senior MIS analyst for the American Federal Savings Bank in Reno, Nev.

Allan Bauker of Hitachi America, Ltd. said Novell is facing a tough challenge but not all by itself. "What they've got going for them is a large installed base of loyal customers and a large base of installed infrastructure."

Others say Novell is late, but maybe not too late. "This is what we wanted them to do two years ago," said a customer who requested anonymity.

Analysts called it a good, though maybe not safe, bet. "If Novell had continued to go head-to-head with Microsoft in the [network operating system] business, they would have had their lunch eaten," said Jamie Lewis, president of The Burton Group in Salt Lake City.

Novell is anxious to start and has already switched a few gears. The company sold off UnixWare (see story, this page), and is putting more resources into developing its directory, management and other services. And the company is hot on integrating these services into all the major flavors of Unix as well as Windows NT (see story).

The result will, hopefully, be a world of heterogeneous computing in which NetWare services — some running natively in NetWare and some running in other operating systems — closely link Reduced Instruction Set Computing and PC-based operating systems, mainframes, intelligent devices, and applications, said Robert Frankenberg, Novell's president and chief executive officer. But will people buy it? Probably.

"As a NetWare user, long-term I see maybe a little better use of resources for NetWare and maybe a better product on a quicker schedule," said John Miller, senior data communications specialist at Healthcare Compare Corp. in Downers Grove, Ill.

Whether or not Novell succeeds, analysts believe that the strategy is the best one possible. "This is a long-overdue breakthrough of the obvious," said Nina Lytton, president of consultancy Open System Advisors, Inc. in Boston. The firm is charging in the right direction but will have to work hard to persuade users to follow it, she added.

One user agrees, saying the shift is both courageous and overdue. "It's a major change of direction [and] pretty dramatic," said John Dubiel, manager of planning and technology at Boston Edison Co. "I'm disappointed that we went a year in the other direction [toward SuperNOS]. They lost a year, so we lost a year. But the ability to integrate NT, that sounds good."

As always, though, the question comes down to whether Novell can deliver on its promises and how seamlessly its integration technology works, said Tim Sloan, an analyst at Aberdeen Group, Inc. in Boston.

The strategy has other risks. Novell's integration plan will rankle customers if it locks them too closely into a Novell environment, rather than acting as a simple gateway, he said.

While the strategy does help users integrate multiple operating systems, Novell doesn't want to sell its services completely independent of NetWare itself, said Neal MacDonald, an analyst at Gartner Group, Inc.

Rather than porting the NetWare Directory Service (NDS) natively to Windows NT, for example, Novell will manage Windows NT servers using an agent that will synchronize the Windows NT name space with NDS, he said. That model would require at least one NetWare 4.1 server in a Windows NT or Unix network.

Novell will port "appropriate services" to run natively on Windows NT, said Novell's Laube, adding that Novell's product road map announcement at this week's NetWorld+Interop would cover the specifics. The announcements will include the availability of NetWare SMP, a World-Wide Web server that runs on symmetric multiprocessing (SMP) hardware and supports Novell's IPX and TCP/IP, and a version of GroupWise that is more closely tied to NDS and also runs as an SMP application, Novell officials said.

Network World *staff contributed to this story.*

UnixWare survives through sale, licensing deal

It's a curious deal. After weeks of speculation, Novell, Inc. last week sold off UnixWare but at the same time is keeping its promise to integrate the operating system with NetWare to create SuperNOS.

The clever arrangement, under which Novell will sell UnixWare to The Santa Cruz Operation, Inc. (SCO) and license it to Hewlett-Packard Co., also gives Novell two huge new resellers. Both SCO and HP plan to integrate NetWare with Unix and resell the combination, which is the equivalent of SuperNOS.

Novell, however, will leave SuperNOS in the hands of its partners and refrain from selling the combination.

The core of the strategy is this three-way deal, the goal of which is to deliver a 32-bit Unix operating system that is fully integrated with NetWare and SuperNOS, by the first quarter of 1997. A 64-bit Unix/NetWare combination system running on the Intel Corp. P7 chip that combines HP's Reduced Instruction Set Computing (RISC) chips with Intel's is due by late 1997 or early 1998.

The agreement benefits all three companies by giving them new features to sell with their own products, while letting each focus on what it does best, said Robert Frankenberg, Novell's president and chief executive officer, who announced the deal at Unix Expo here with officials of SCO and HP.

SCO's role is to merge its OpenServer Unix variation with UnixWare by the first half of 1997, add support for NetWare services, then sell the combination through its high-volume sales channel. To get things rolling, SCO will deliver in mid-1996 a tool kit to help developers access NetWare and Unix services on the combined platform.

HP plans to combine NetWare with its HP-UX, combine Novell's NetWare Directory Service (NDS) with the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE) and provide an enterprise-level direct sales force for NetWare/Unix products.

"One of the wonderful things about this agreement is that we have access to HP's direct sales force, which has a wonderful reputation, and SCO's [value-added resellers], and that's getting us into areas maybe we weren't in before," Frankenberg said.

The deal also lets Novell focus more intently on developing NetWare and NetWare services to run on other operating systems, as well as intelligent devices, Frankenberg said. About 400 Novell developers who were working on UnixWare will be reassigned or offered jobs at SCO or HP, he added.

SCO is scheduled to take over UnixWare sales as soon as the deal closes late this year and sell both products until it ships a merged product that supports all NetWare services.

Meanwhile, HP will license NetWare code and NDS for the RISC-based HP-UX operating system. The result will be a RISC-based version of SuperNOS to complement SCO's Intel-based version, letting the triumvirate address both the low and high end of the Unix market, said Willem Roelandts, senior vice president and general manager of HP's Computer Systems Organization.

More companies could be involved in the arrangement. For instance, Novell will work with HP, and possibly IBM, to integrate NDS with the DCE, an open networking spec that includes a directory and remote procedure calls (RPC).

HP next year will ship a 64-bit version of HP-UX that supports NetWare services, and the firm will continue its development with Intel of the P7 microprocessor, which will combine the Intel and RISC platforms and ship sometime in late 1997 or 1998, Roelandts said.

The version of HP-UX that runs on that platform will also be tightly integrated with NetWare, merging all the NetWare/Unix variants into a single operating system that both HP and SCO can sell. Each, however, will develop add-ons designed to differentiate their products from one another.

That operating system will support the integrated NDS/DCE directory and RPCs, officials said.

OOPS!

Novell sold UnixWare and the Unix source code to SCO in exchange for 6.1 million shares, about 17% of SCO stock worth some $60 million. In 1992, Novell agreed to pay AT&T $360 million for the same technology. Novell will get royalties from UnixWare sales.

AT&T

Continued from page 1

strategy. For example, AT&T's budding multimedia offering has been based on WorldWorx Network Services and AT&T Global Information Solutions' (GIS) Vistium conferencing products.

While Vistium systems have been technically just one more end point in the company's multimedia network, AT&T GIS has received preferential treatment and been first to market with multipoint conferencing.

Now that GIS is being relegated to the status of "just another partner," Intel Corp., Apple Computer, Inc., IBM and other WorldWorx partners might be inclined to accelerate product development, said John Scholes, president of Regent Associates International, Inc., an investment analysis firm in East Hartland, Conn.

The president of the AT&T Global Definity Users Group, which comprises large AT&T private branch exchange customers, also sees the changes making her organization more powerful.

"[The former GBCS] will have to stand or fall on its own merit now, so they will be forced to focus on what we want," said Renee Seay, who is also the communications services manager at Advanced Micro Devices, Inc.

Users might also see AT&T come out with new international services faster since the services arm will no longer be chained to using AT&T gear in foreign countries, observers said. Instead, the company would have the option to use switches from global vendors whose gear has already been certified by foreign telephone companies.

New services could flow from unexpected areas. For example, the AT&T Universal Card is being brought under the wing of the communications company, according to Daniel Briere, president of TeleChoice, Inc., a consultancy in Verona, N.J.

There has been interest among users of AT&T's Software-Defined Network (SDN) service to combine the Universal Card's general credit card capabilities with billing codes captured via SDN's own calling card, Briere said.

As a result, travel and entertainment expenses could be combined with telecommunications expenses.

Those users who only do business with one AT&T entity are excited by the prospect of the divested companies focusing more time on user needs.

Bryan Paxson, manager of communications at Freightliner Corp. and an AT&T services user, said he would like to see AT&T bring switched, private-line, frame relay and wireless services under one discount umbrella, something he is not getting now.

AT&T officials last week were practically wearing the new flexibility on their sleeves. For example, Chief Executive Officer Robert Allen acknowledged that the Network Systems division has encountered problems selling gear to regional Bell operating companies that are at war with AT&T over telecommunications reform legislation.

But under the new structure, Network Systems — reconstituted with the PBX-oriented GBCS to form the heart of the communications equipment business (see graphic) — is expected to get little or no political pressure selling to other carriers.

And it has big plans in the WAN switching arena. The next release of Network Systems' flagship 5ESS central office switch reportedly will take the company down the path to an all-purpose voice and data feeder switch into ATM backbones.

Briere pointed out that this path until now has raised concerns about competition with products from StrataCom, Inc., AT&T's primary supplier for switches used to support data services such as frame relay. Now the equipment company should be free to do as it wishes.

Still, many questions remain. For example, while the communications equipment firm will contain Network Systems and GBCS, there is little architectural similarity between the groups' product lines, said Bart Stanco, a senior analyst with Gartner Group, Inc., a market research firm in Stamford, Conn.

The reorganization will not be completed until the end of 1996. But the excitement it generated last week was palpable. "It's a slam dunk," Briere said.■

For more info on this story, point your browser at http://www.nwfusion.com. After you log on, select News+ and then the Front Page.

SPLITSVILLE

The 3 companies that will emerge from the existing AT&T:

Company	Revenue	Focus	Business units involved	Products and services
AT&T	$49 billion	Network services	Business Communications Services, Consumer Communications Services, AT&T Wireless, AT&T Solutions and AT&T Universal Card	Switched, private line, packet data and wireless services, Network Notes, NetWare Connect Services, outsourcing and credit cards
Communications equipment company	$20 billion	Voice and data network equipment	Global Business Communications Systems, Network Systems, Paradyne, Microelectronics and Consumer Products	Telephones, PBXs, central office switches, fiber termination equipment, modems, muxes, DSU/CSUs, semiconductors and power systems
Computer company	$8 billion	Computer equipment	AT&T Global Information Solutions	Servers, mid-range computers, POS terminals, ATMs, imaging systems and software

AT&T Bell Laboratories will be split among the first two companies.

MCI squares off against the new AT&T

In one simple swoop, MCI Communications Corp. last week boosted its managed data network services portfolio and leaped into the outsourcing business.

The carrier said it will lay out $1 billion to buy SHL Systemhouse, Inc., a Canadian IT consultant, systems integrator and data center management firm. As an MCI business unit, SHL Systemhouse will swallow MCI's Professional Services division, formed in the summer of 1994 to provide managed frame relay and Switched Multimegabit Data Service (SMDS) offerings.

At first blush, MCI's jump into the computer services business seemed in vivid contrast to AT&T's divestiture of its computer operations. But observers noted that it actually puts MCI more squarely up against the new AT&T, even after the breakup. Despite the restructuring, AT&T's AccuWAN managed network business and its outsourcing business, known as AT&T Solutions, will remain within the AT&T communications business.

MCI needs the help. The company has generally been considered a step behind AT&T and other competitors in managed network services. Although MCI claims about 100 managed network customers — and offers the industry's only managed SMDS service — the only customer it has identified is NationsBank.

"They have shown less of a prowess in this area than either AT&T or Sprint," said Jeffrey Kaplan, director of network integration services research at Dataquest, Inc. "And I think they have failed to articulate their strategy, at least up until this moment."

MCI and SHL have enjoyed a partner relationship ever since SHL chose MCI as its preferred carrier two years ago, said John Todd, MCI's vice president of professional services. Todd lauded SHL for its strength in performing simultaneous client/server migrations and takeover of data center operations. But SHL also has endured a lot of executive turnover, said one industry source, and "they've overextended themselves in a lot of contracts."

Bay Networks

Continued from page 1

"Bay's approach is the strongest support of RMON and RMON2 of any vendor," said Michael Howard, president of Infonetics Research Institute, Inc. "Nobody's committed to that [breadth] of support. With this lead, Cisco is going to have to respond."

Cisco has announced RMON support on its Catalyst and Kalpana switches via alliances with Frontier Software Development, Inc. and Axon Networks, Inc., respectively.

"Bay's going to cover all of their products with a consistent set of agents. And the agents are smarter than just doing RMON," John McConnell said.

But the company has neither articulated an RMON2 strategy nor plans to put RMON on any other device.

Bay Networks' RMON agents come from a single source — Bay — which ensures consistency of data collection and representation, analysts said. And Bay Networks' plan to link RMON and RMON2 to the autotopology feature of Optivity will force Cisco to respond in kind, analysts added.

"Bay's going to cover all of their products with a consistent set of agents," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo. "And the agents are smarter than just doing RMON."

Linking RMON and RMON2 to an autotopology tool will not only let users determine which node is churning out the most traffic, but it will also help them physically locate the node.

Expected releases

Bay Networks officials declined to comment on the announcement, which will be made at the NetWorld+Interop show here. But according to analysts who have been briefed on the initiative, the rollout will commence this week with immediate availability of some of the new products.

RMON capabilities will be added to Bay Networks' Access Node and Access Node Hub low-end routers through a new Data Collection Module (DCM). DCM will essentially serve as an RMON probe for those devices, collecting media access control layer statistics and reporting that data to an Optivity console.

For higher end routers — particularly the Access Stack Node, the Backbone Link Node and Backbone Concentrator Node — Bay Networks will add a feature called Packet Capture & Filter to Release 9.0 of the Wellfleet routing software.

Packet Capture & Filter will enable users to analyze and decode packets going through all the interfaces of a Bay Networks router from a central Optivity console.

RMON2 functions

Collection of network layer statistics will be made possible by the addition of RMON2-type functions to the company's Advanced Analyzer agent software.

Bay Networks is planning to add the RMON2-enabled agent software to its 27XX, 28XX, 3000, Distributed 5000 and Lattis System 5000 hubs next month, analysts said.

The company also plans to embed RMON and RMON2 in its switches, but only when it's cost-effective to do so, analysts said.

Bay Networks' SpeedSwitch, however, already has RMON capabilities as a result of an alliance between Centillion Networks, Inc., which was acquired

See **Bay Networks,** *page 136*

Automakers

Continued from page 1

replace the mix of value-added networks that each automaker uses today to reach the thousands of manufacturers supplying the Big Three.

With the goal of moving the bulk of its business applications to TCP/IP, the Big Three looked hard at the public Internet as the highway to reach suppliers. But the automakers decided that would be a dangerous road due to the public Internet's lack of managed routes.

''Unfortunately, when your data leaves your location, you have no idea how it travels,'' said Fred Hakim, Chrysler's manager for strategic planning. Hakim also noted that hackers present a threat on the Internet, and network reliability is far from certain.

But the more secure and entirely private alternative — dedicated TCP/IP links between automaker and supplier — would result in duplicate links at unreasonable costs, Hakim said.

Instead, the group plans to blend public and private aspects of the 'Net, creating a system that connects a limited number of Internet providers with fixed routing paths to suppliers.

Since the plan will involve connecting internal corporate TCP/IP backbones to the Internet, GM, Ford and Chrysler will require their suppliers to go through a certification process to assure that appropriate security measures, such as firewalls, are in place.

''The trading partners are going to have to meet technical criteria,'' said Joe Boyd, the network manager at Ford responsible for supplier connections.

Some car suppliers who heard the Big Three present their plans at the Automotive Industry Action Group conference here last week reacted favorably to the idea.

''It's still in the early stages, but ANX would probably be the cheapest plan for us,'' said Thomas Hereford, senior systems analyst at Simpson Industries, Inc., which has 10 manufacturing plants in-terconnected via TCP/IP.

"It's still in the early stages, but ANX would probably be the cheapest plan for us," Thomas Hereford said.

Not open enough?

Because only GM, Ford and Chrysler will control ANX, this exclusionary nature could burden suppliers with the same problem they face today — having to support multiple access services to meet demands from important customers.

ANX was limited to the Big Three in order to keep the planning process manageable, said Robert Moskowitz, technical support specialist at Chrysler. ANX is expected to become the Big Three's primary transport facility to reach a wide variety of trading partners, including insurance providers and auto dealers, he added.

Some of the vehicle manufacturers shut out of ANX, such as Deere & Co. and Caterpillar, Inc., are working to create their own version of ANX, according to industry sources.

Last week, the Big Three managers said they will begin the procurement process for ANX this fall, with the goal of getting the virtual private Internet up and running next year. ■

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Electronic commerce takes a few hits

Electronic commerce doomsayers have been vindicated somewhat based on events of the past few weeks, but industry observers say not to give up just yet on the Internet as a place to do business.

Netscape Communications Corp. last week was forced to acknowledge that the credit card encryption technology used in its Navigator 1.0 World-Wide Web browser — a key tool for enabling electronic commerce over the Internet — is far from airtight. Two University of California at Berkeley graduate students brought this news to light when they cracked the code.

''This is a problem, and we are implementing a fix,'' said Atri Chatterjee, Netscape's director of server marketing.

The Netscape problem followed in the wake of news earlier this month that Sprint Corp.'s SprintLink IP service out of Chicago was down for at least several hours, raising the ire of users.

Another user, who asked not to be named, reported problems with the E-mail server in MCI Communications Corp.'s internetMCI service. He complained about having had downtime on 50 out of 80 days.

Analysts cautioned that the incidents — the Netscape one in particular — do not mean that the sky is falling on electronic commerce.

''The [Netscape] browser has a serious vulnerability, but the bottom line is that someone needs to have access to your internal network, not the Internet, to take advantage of the flaw,'' said John Pescatore, an analyst with IDC Government, a Falls Church, Va.-based consultancy.

By David Rohde and Ellen Messmer

RMON news floods Interop

Bay Networks, Inc. won't be the only vendor with RMON news at NetWorld+Interop.

Optical Data Systems, Inc. (ODS) and Axon Networks, Inc. this week will announce the addition of Axon's LANServant Enterprise Communications Analysis Module (ECAM) to ODS' Infinity LanVision management tool.

As a precursor to RMON2, which is expected to be approved sometime in early 1996, the ECAM software will make it possible for users of ODS' Infinity hub to gather protocol statistics from the network layer through the application layer, according to the companies.

With the higher layer protocol statistics, LanVision will enable customers to manage performance across multiple LAN segments and collect end-to-end statistics for protocols such as IP, IPX, DECnet and Banyan Systems, Inc.'s VINES.

''RMON2 excites me; RMON never did,'' said Michael Howard, president of Infonetics Research Institute, Inc. in San Jose, Calif. ''RMON2 does the real job of letting you look at traffic across the whole network. RMON just allows you to look at a single segment at a time.''

For example, ECAM/LanVision integration can help customers plan deployment of routers or other internetwork gear, as well as determine what users are vying for bandwidth on LAN and WAN links.

The new features provide full coverage of the IP and IPX stacks through the application layer, including: Network File System, Simple Mail Transfer Protocol and World-Wide Web protocols; the DECnet stack through the network and transport layers, including Local Area Transport and Pathworks; and NETBIOS-based applications, including Lotus Notes, Microsoft Mail and cc:Mail.

ECAM will be incorporated into Infinity LanVision management software in the fourth quarter 1995. List price starts at $6,000.

Bay Networks

Continued from page 135

by Bay Networks, and Hewlett-Packard Co.

Lastly, Bay Networks will announce Optivity Design & Analysis 6.0.

Through an alliance with Armon Networking, Inc. of Santa Barbara, Calif., Version 6.0 will include a new application, new software tools and enhancements to two existing packages.

The new application is called TrafficMan 1.0. This package graphically displays end-to-end traffic by network protocol, making it possible to identify network bottlenecks and launch protocol decodes for specific conversations.

The new tools, called Global RMON, will provide packet capture and decode for LANs and WANs, and statistical and historic data on segments and hosts for baselining purposes.

The two enhanced applications are called DesignMan 2.0 and TrendMan 2.1. DesignMan 2.0 provides rudimentary, RMON-based what-if scenarios for simulating and recommending network changes and reconfigurations.

TrendMan 2.1 automatically collects and displays information related to long-term performance trends, allowing network managers to plan network expansion.

In the future, Bay Networks plans to expand on the RMON and RMON2-capable products with applications for accounting, network security, and client/server design and simulation, as well as and response time monitoring, analysts said. The accounting application could come by the end of the year, they said. ■

Swinging the RMON hammer

Bay Networks' net management additions:

RMON support for all routers

- Hardware-based implementation for Access Node and Access Node Hub.
- Softare-based implementation for Access Stack Node and Backbone Nodes.

Early RMON2-type support in Advanced Analyzer

- Supports hubs, routers and switches.

Optivity Design & Analysis 6.1

- A new class of applications based on RMON2-like technology.

Back to Reality

Vendor technology partnerships pose hidden peril to quality solutions

Abbott and Costello, one of America's great comedy teams, delighted audiences during the '40s with a skit called Who's On First? The topic was baseball — familiar ground for all. Most listeners were laughing just moments into the repartee.

They were also utterly confused.

The comedians posed as an umpire and a player. The umpire asked who was on first base. "Who," responded the other. Who was the first baseman's name, which was incomprehensible to the umpire and the start of a nonsensical dialog.

David J. Buerger

Like this skit, knowing who's on first in the networking industry is no longer clear.

Keeping tabs on vendors entails more than just following the game of musical chairs going on now — which, in itself, is quite a chore. A firm is here today and divested, merged or acquired tomorrow.

Change is inevitable, but you have to wonder whether all this change spawns better products. It's getting harder and harder to tell. Along with industry consolidation, one big source of the confusion is the increasingly tangled web of so-called strategic alliances and partnerships among networking vendors.

Living together

A partnerships is different from an acquisition or merger. The latter is like a marriage, where two become one — just as Bay Networks, Inc. bought Centillion Networks, Inc. last May.

A partnership is akin to living together, such as Bay Networks' and IBM's agreement last week to jointly do interoperability testing and cross-marketing of their token-ring switching products.

Partnerships are in vogue. Stories of new liaisons fill trade publications, but no one can remember who is sleeping with whom. Trade pubs need bigger indexes.

Temporary agreements are less expensive than buying a company, but this thrift has its price, starting with how the companies discuss the alliance.

Consider introductions. It's easy to present a spouse, but partnerships are a different matter. Everyone stumbles presenting a temporary partner, especially when the relationship is nebulous.

"This is Drusie Smith with Centillion, a business unit of Bay Networks," is a lot smoother than, "This is Sheryl Adams with Bay Networks and Pamela Johnson with IBM — they're competitors, uh, partners, uh — oh heck, you know who they are!"

We may know the companies, but the genealogy of their product lines is represented by a pretty twisted family tree.

IBM, for instance, is looking to Bay Networks (more specifically, Centillion) for the Centillion 100 token-ring switch. The word is customers want to buy now, but IBM can't make the promised ship date for its 8272 NwaysT token-ring switch. Partnering with Bay Networks seemed preferable to losing sales.

Bay Networks says it will resell IBM's switch, but it's not clear why — especially since part of the 8272's technology was born in Kalpana, Inc.'s lab.

Kalpana, as you may recall, is now owned by Cisco Systems, Inc. IBM also resells intelligent hub technology from Chipcom Corp., a subsidiary of 3Com Corp. Got that?

By the way: IBM, Bay Networks, Cisco and 3Com are also vicious competitors in the internetworking arena.

New trend

Anticipate an increase in these strange alliances. Some partners (usually those with the most to gain) will trumpet the new relationships; others will proceed with stealth.

We're in the midst of a new phase in the networking industry driven by shrinking margins on commoditized boxes and the rapid pace of technology evolution. Big companies, such as IBM, can no longer fund cherished initiatives, even for technologies they invented (such as token ring).

You might ask: "Is this good for me?"

On one hand, partnerships lower development costs, speed new product introductions and expand distribution. But technology sharing among market competitors can stifle innovation. You wind up buying the same thing under different labels.

Swiss psychologist Carl Jung once said, "The heaping together of paintings by old masters in museums is a catastrophe; likewise, a collection of 100 Great Brains makes one big fathead."

Within five years, a good percentage of networking gear will become as commoditized as sound systems. The only difference between products will be brand labels and box fronts.

New, advanced technologies such as ATM are not immune from this trend. Think about it: Demand is low, yet hundreds of vendors are sharing technology as they chase this pot of gold. Their only hope is a small slice of a potentially big market. Technology alliances make this trend inevitable. But that does not mean these products have to be substandard. Network managers should push vendors to put energy into partnerships. Coasting on a vendor partner's technological laurels won't help customers.

Boxes and brands may be similar, but unless vendors deliver superior networking solutions, users won't get to first base. They'll be out at the plate.

Buerger is an Atlanta-based writer and industry consultant. He can be reached at dbuerger@pipeline.com.

CyberSpeak

Voices from the reader network

How much interest do you have in public network-based applications, such as AT&T's Network Notes?

■ "It's a swell idea. It's good and it's doable. I've been real anxious for us to do it. Right now if we have a document and it's in Chicago, they either have to fax it to me or they have to put it in an envelope and send it to me.

"I can't go out and pick up a copy of the file that's got the document in it. I'm hoping that with a service like this we'll be able to do that down the road somewhere."
Bob Athey, network administrator, Sara Lee Corp., Detroit

■ "We're implementing our new remote office connectivity system, which includes groupware for many applications — accounting, merchandising, contracting, procurement. If you've got an infrastructure you've put in place, why would you outsource that? We have it there to support our stores and distribution centers. Why wouldn't you use the same network?

"Then again, we didn't really know anyone was doing this on an outsourcing basis. We're in a pretty early stage, so that's probably something we ought to be looking at. It depends on what the price is."
Sue Dubman, chief information officer, Navy Exchange Service Command, Virginia Beach

NEXT QUESTION

Are you broken up about AT&T breaking up?

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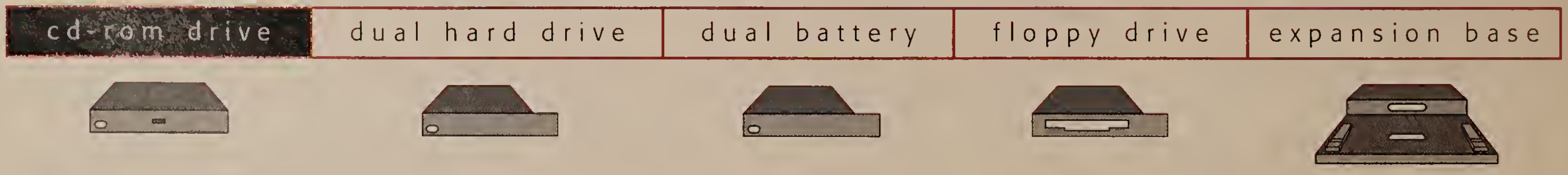

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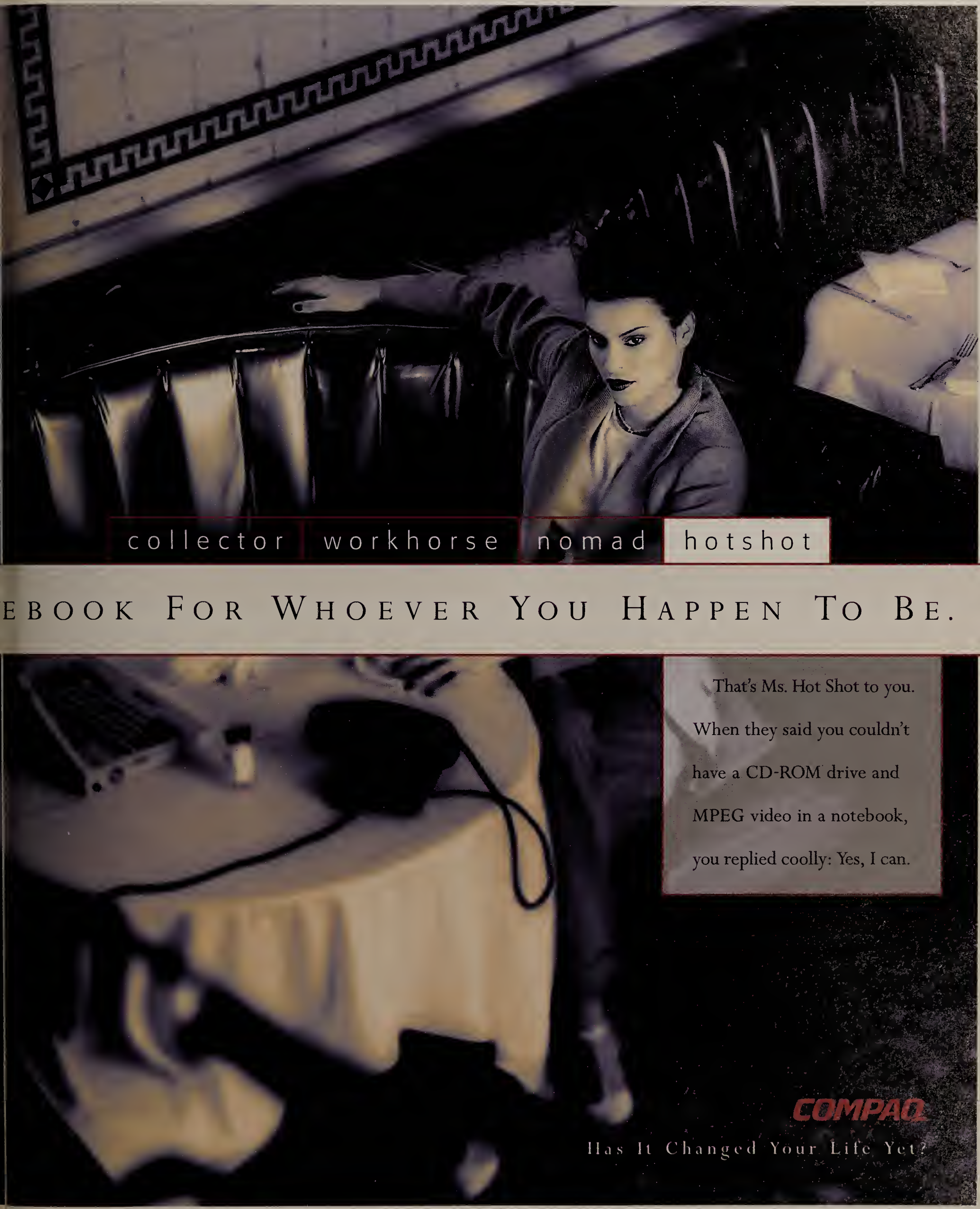
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